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EPA-OTS
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Comprehensive Assessment Information Rule

REPORTING FORM

When completed, send this form to:	For Agency Use Only:
Document Processing Center Office of Toxic Substances, TS-790 U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 Attention: CAIR Reporting Office	Date of Receipt: _____ Document Control Number: _____ Docket Number: _____

EPA Form 7710-52

SECTION 1 GENERAL MANUFACTURER, IMPORTER, AND PROCESSOR INFORMATION

PART A GENERAL REPORTING INFORMATION

1.01 This Comprehensive Assessment Information Rule (CAIR) Reporting Form has been completed in response to the Federal Register Notice of..... [1][2] [2][2] [8][8]
mo. day year

CBI

[ ] a. If a Chemical Abstracts Service Number (CAS No.) is provided in the Federal Register, list the CAS No. ..... [0][2][6][4][7][1]-[6][2]-[5]

b. If a chemical substance CAS No. is not provided in the Federal Register, list either (i) the chemical name, (ii) the mixture name, or (iii) the trade name of the chemical substance as provided in the Federal Register.

(i) Chemical name as listed in the rule ..... N/A

(ii) Name of mixture as listed in the rule .... N/A

(iii) Trade name as listed in the rule ..... N/A

c. If a chemical category is provided in the Federal Register, report the name of the category as listed in the rule, the chemical substance CAS No. you are reporting on which falls under the listed category, and the chemical name of the substance you are reporting on which falls under the listed category.

Name of category as listed in the rule ..... N/A

CAS No. of chemical substance ..... [ ][ ][ ][ ][ ][ ]-[ ][ ]-[ ]

Name of chemical substance .....

1.02 Identify your reporting status under CAIR by circling the appropriate response(s).

CBI

Manufacturer 1

[ ] Importer 2

Processor ..... (3)

X/P manufacturer reporting for customer who is a processor 4

X/P processor reporting for customer who is a processor 5

[ ] Mark (X) this box if you attach a continuation sheet.

1.03 Does the substance you are reporting on have an "x/p" designation associated with it in the above-listed Federal Register Notice?

CBI

[ ]

Yes ..... [XX] Go to question 1.04

No ..... [ ] Go to question 1.05

1.04 a. Do you manufacture, import, or process the listed substance and distribute it under a trade name(s) different than that listed in the Federal Register Notice? Circle the appropriate response.

CBI

[ ]

Yes 1

No ..... (2)

b. Check the appropriate box below:

[ ] You have chosen to notify your customers of their reporting obligations

Provide the trade name(s) .... _____

_____

[ ] You have chosen to report for your customers

[ ] You have submitted the trade name(s) to EPA one day after the effective date of the rule in the Federal Register Notice under which you are reporting.

1.05 If you buy a trade name product and are reporting because you were notified of your reporting requirements by your trade name supplier, provide that trade name.

CBI

[ ]

Trade name ..... Rubinate TDI

Is the trade name product a mixture? Circle the appropriate response.

Yes 1

No ..... (2)

1.06 Certification -- The person who is responsible for the completion of this form must sign the certification statement below:

CBI

[ ]

"I hereby certify that, to the best of my knowledge and belief, all information entered on this form is complete and accurate."

Peter J. Erber	Peter J. Erber	July 6, 1989
NAME	SIGNATURE	DATE SIGNED

Vice Pres., Manufacturing	(601) 562 - 8203
TITLE	TELEPHONE NO.

[ ] Mark (X) this box if you attach a continuation sheet.

1.07 Exemptions From Reporting -- If you have provided EPA or another Federal agency with the required information on a CAIR Reporting Form for the listed substance within the past 3 years, and this information is current, accurate, and complete for the time period specified in the rule, then sign the certification below. You are required to complete section 1 of this CAIR form and provide any information now required but not previously submitted. Provide a copy of any previous submissions along with your Section 1 submission.

CBI

[ ]

"I hereby certify that, to the best of my knowledge and belief, all required information which I have not included in this CAIR Reporting Form has been submitted to EPA within the past 3 years and is current, accurate, and complete for the time period specified in the rule."

N/A		
NAME	SIGNATURE	DATE SIGNED
TITLE	( ) - TELEPHONE NO.	DATE OF PREVIOUS SUBMISSION

1.08 CBI Certification -- If you have asserted any CBI claims in this report you must certify that the following statements truthfully and accurately apply to all of those confidentiality claims which you have asserted.

CBI

[ ]

"My company has taken measures to protect the confidentiality of the information, and it will continue to take these measures; the information is not, and has not been, reasonably ascertainable by other persons (other than government bodies) by using legitimate means (other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding) without my company's consent; the information is not publicly available elsewhere; and disclosure of the information would cause substantial harm to my company's competitive position."

N/A		
NAME	SIGNATURE	DATE SIGNED
TITLE	( ) - TELEPHONE NO.	

[ ] Mark (X) this box if you attach a continuation sheet.

PART B CORPORATE DATA

1.09 Facility Identification

CBI Name [C][H][R][O][M][C][R][A][F][T][ ][F][U][R][N][I][T][U][R][E][ ][ ][ ][ ][ ]

[ ] Address [#][1][ ][Q][U][A][L][I][T][Y][ ][L][A][N][E][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
Street

[S][E][N][A][T][O][B][I][A][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[M][S] [3][8][6][6][8]--[0][1][2][6]
State Zip

Dun & Bradstreet Number .....[0][0]-[6][2][9]-[4][7][7][1]

EPA ID Number .....M.S.D.[0][0][6][2][9][4][7][7][1]

Employer ID Number .....1.4.-.[0][1][4][8][7][1][0][1]

Primary Standard Industrial Classification (SIC) Code .....[2][5][1][2]

Other SIC Code .....[2][5][1][4]

Other SIC Code .....[2][8][2][1]

1.10 Company Headquarters Identification

CBI Name [N][/][A][ ]

[ ] Address [ ]
Street

[ ]
City

[ ][ ] [ ][ ][ ][ ][ ]--[ ][ ][ ][ ]
State Zip

Dun & Bradstreet Number .....[ ][ ]-[ ][ ][ ]-[ ][ ][ ][ ]

Employer ID Number .....[ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Mark (X) this box if you attach a continuation sheet.

1.11 Parent Company Identification

CBI Name [M][O][H][A][S][C][O][ ][C][O][R][P].[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Address [4][4][0][1][ ][F][A][I][R][ ][L][A][K][E][ ][C][O][U][R][T][ ][ ][ ][ ][ ]
Street

[F][A][I][R][F][A][X][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[V][A] [2][2][0][3][3]--[3][8][9][8]
State Zip

Dun & Bradstreet Number .....[0][0]-[6][2][9]-[4][7][7][1]

1.12 Technical Contact

CBI Name [C][L][A][U][D][I][A][ ][P][A][R][K][E][R][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Title [P][L][A][N][T][ ][C][H][E][M][I][S][T][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Address [#][1][ ][Q][U][A][L][I][T][Y][ ][L][A][N][E][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
Street

[S][E][N][A][T][O][B][I][A][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[M][S] [3][8][6][6][8]--[0][1][2][6]
State Zip

Telephone Number .....[6][0][1]-[5][6][2]-[8][2][0][3]

1.13 This reporting year is from ..... [0][1] [8][8] to [1][2] [8][8]
Mo. Year Mo. Year

[ ] Mark (X) this box if you attach a continuation sheet.

1.14 Facility Acquired -- If you purchased this facility during the reporting year, provide the following information about the seller:

CBI Name of Seller [N/A]

[ ] Mailing Address

Street

City

State Zip

Employer ID Number .....

Date of Sale ..... Mo. Day Year

Contact Person

Telephone Number .....

1.15 Facility Sold -- If you sold this facility during the reporting year, provide the following information about the buyer:

CBI Name of Buyer [MOHASCO CORP.]

[ ] Mailing Address [4401 FAIR LAKE COURT]

Street

[FAIRFAX]

City

[VA] [22033]--[3898]

State Zip

Employer ID Number .....14-[0147]

Date of Purchase ..... Mo. Day Year

Contact Person [THOMAS J. NESS]

Telephone Number .....[601]-[562]-[8203]

[ ] Mark (X) this box if you attach a continuation sheet.

PART C IDENTIFICATION OF MIXTURES

1.17 Mixture -- If the listed substance on which you are required to report is a mixture or a component of a mixture, provide the following information for each component chemical. (If the mixture composition is variable, report an average percentage of each component chemical for all formulations.)

CBI

[ ]

Component Name	Supplier Name	Average % Composition by Weight (specify precision, e.g., 45% ± 0.5%)
N / A		
	Total	100%

[ ] Mark (X) this box if you attach a continuation sheet.

1.16 For each classification listed below, state the quantity of the listed substance that was manufactured, imported, or processed at your facility during the reporting year.

CBI

[ ]

Classification	Quantity (kg/yr)
Manufactured	N / A
Imported	N / A
Processed (include quantity repackaged)	92,848
Of that quantity manufactured or imported, report that quantity:	
In storage at the beginning of the reporting year	N / A
For on-site use or processing	N / A
For direct commercial distribution (including export)	N / A
In storage at the end of the reporting year	N / A
Of that quantity processed, report that quantity:	
In storage at the beginning of the reporting year	10,977
Processed as a reactant (chemical producer)	92,848
Processed as a formulation component (mixture producer)	0
Processed as an article component (article producer)	0
Repackaged (including export)	0
In storage at the end of the reporting year	16,105

[ ] Mark (X) this box if you attach a continuation sheet.

2.04 State the quantity of the listed substance that your facility manufactured, imported, or processed during the 3 corporate fiscal years preceding the reporting year in descending order.

CBI

[ ] Year ending ..... [1][2] Mo. [8][7] Year

Quantity manufactured ..... 0 kg

Quantity imported ..... 0 kg

Quantity processed ..... 124,676 kg

Year ending ..... [1][2] Mo. [8][6] Year

Quantity manufactured ..... 0 kg

Quantity imported ..... 0 kg

Quantity processed ..... 110,089 kg

Year ending ..... [1][2] Mo. [8][5] Year

Quantity manufactured ..... 0 kg

Quantity imported ..... 0 kg

Quantity processed ..... 97,359 kg

2.05 Specify the manner in which you manufactured the listed substance. Circle all appropriate process types.

CBI

[ ]

Continuous process ..... N/A ... 1

Semicontinuous process 2

Batch process 3

[ ] Mark (X) this box if you attach a continuation sheet.

2.06 Specify the manner in which you processed the listed substance. Circle all appropriate process types.

CBI

[ ]

Continuous process 1

Semicontinuous process ..... (2)

Batch process 3

2.07 State your facility's name-plate capacity for manufacturing or processing the listed substance. (If you are a batch manufacturer or batch processor, do not answer this question.)

CBI

[ ]

Manufacturing capacity ..... N / A kg/yr

Processing capacity ..... U K kg/yr

2.08 If you intend to increase or decrease the quantity of the listed substance manufactured, imported, or processed at any time after your current corporate fiscal year, estimate the increase or decrease based upon the reporting year's production volume.

CBI

[ ]

	Manufacturing Quantity (kg)	Importing Quantity (kg)	Processing Quantity (kg)
Amount of increase	N / A	N / A	N / A
Amount of decrease	N / A	N / A	N / A

[ ] Mark (X) this box if you attach a continuation sheet.

2.09 For the three largest volume manufacturing or processing process types involving the listed substance, specify the number of days you manufactured or processed the listed substance during the reporting year. Also specify the average number of hours per day each process type was operated. (If only one or two operations are involved, list those.)

CBI

[ ]

	Days/Year	Average Hours/Day
Process Type #1 (The process type involving the largest quantity of the listed substance.)		
Manufactured	N / A	
Processed	2 4 3	8
Process Type #2 (The process type involving the 2nd largest quantity of the listed substance.)		
Manufactured	N / A	
Processed	N / A	
Process Type #3 (The process type involving the 3rd largest quantity of the listed substance.)		
Manufactured	N / A	
Processed	N / A	

2.10 State the maximum daily inventory and average monthly inventory of the listed substance that was stored on-site during the reporting year in the form of a bulk chemical.

CBI

[ ]

Maximum daily inventory		kg
Average monthly inventory		kg

[ ] Mark (X) this box if you attach a continuation sheet.

2.11 Related Product Types -- List any byproducts, coproducts, or impurities present with the listed substance in concentrations greater than 0.1 percent as it is manufactured, imported, or processed. The source of byproducts, coproducts, or impurities means the source from which the byproducts, coproducts, or impurities are made or introduced into the product (e.g., carryover from raw material, reaction product, etc.).

CBI

[ ]

CAS No.	Chemical Name	Byproduct, Coproduct or Impurity[1]	Concentration (%) (specify ± % precision)	Source of Byproducts, Coproducts, or Impurities
N / A				

[1]Use the following codes to designate byproduct, coproduct, or impurity:

B = Byproduct
C = Coproduct
I = Impurity

[ ] Mark (X) this box if you attach a continuation sheet.

2.12 Existing Product Types -- List all existing product types which you manufactured, imported, or processed using the listed substance during the reporting year. List the quantity of listed substance you use for each product type as a percentage of the total volume of listed substance used during the reporting year. Also list the CBI quantity of listed substance used captively on-site as a percentage of the value [ ] listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

a. Product Types[1]	b. % of Quantity Manufactured, Imported, or Processed	c. % of Quantity Used Captively On-Site	d. Type of End-Users[2]
B	100%	100%	I

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.13 Expected Product Types -- Identify all product types which you expect to manufacture, import, or process using the listed substance at any time after your current corporate fiscal year. For each use, specify the quantity you expect to manufacture, import, or process for each use as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

CBI
[ ]

a. Product Types[1]	b. % of Quantity Manufactured, Imported, or Processed	c. % of Quantity Used Captively On-Site	d. Type of End-Users[2]
B	100 %	100%	I

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.14 CBI [ ] Final Product -- Complete the following table for each type of final product manufactured, imported, or processed at your facility that contains the listed substance other than as an impurity.

a. Product Type[1]	b. Final Product's Physical Form[2]	c. Average % Composition of Listed Substance in Final Product	d. Type of End-Users[3]
N / A			

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the final product's physical form:

A = Gas
B = Liquid
C = Aqueous solution
D = Paste
E = Slurry
F1 = Powder
F2 = Crystalline solid
F3 = Granules
F4 = Other solid
G = Gel
H = Other (specify) _____

[3]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.15 CBI Circle all applicable modes of transportation used to deliver bulk shipments of the listed substance to off-site customers.

[ ] Truck ..... N / A 1

Railcar 2

Barge, Vessel 3

Pipeline 4

Plane 5

Other (specify) _____ 6

2.16 CBI Customer Use -- Estimate the quantity of the listed substance used by your customers or prepared by your customers during the reporting year for use under each category of end use listed (i-iv).

[ ]

Category of End Use

i. Industrial Products

Chemical or mixture ..... N / A kg/yr

Article ..... N / A kg/yr

ii. Commercial Products

Chemical or mixture ..... N / A kg/yr

Article ..... N / A kg/yr

iii. Consumer Products

Chemical or mixture ..... N / A kg/yr

Article ..... N / A kg/yr

iv. Other

Distribution (excluding export) ..... N / A kg/yr

Export ..... N / A kg/yr

Quantity of substance consumed as reactant ..... N / A kg/yr

Unknown customer uses ..... N / A kg/yr

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 3 PROCESSOR RAW MATERIAL IDENTIFICATION

PART A GENERAL DATA

3.01 Specify the quantity purchased and the average price paid for the listed substance for each major source of supply listed. Product trades are treated as purchases.
CBI The average price is the market value of the product that was traded for the listed substance.
[ ]

Source of Supply	Quantity (kg)	Average Price ($/kg)
The listed substance was manufactured on-site.	N / A	
The listed substance was transferred from a different company site.	N / A	
The listed substance was purchased directly from a manufacturer or importer.	97,976	$2.0980
The listed substance was purchased from a distributor or repackager.	N / A	
The listed substance was purchased from a mixture producer.	N / A	

3.02 Circle all applicable modes of transportation used to deliver the listed substance to
CBI your facility.
[ ]

Truck ..... (1)
Railcar 2
Barge, Vessel 3
Pipeline 4
Plane 5
Other (specify) _____ 6

[ ] Mark (X) this box if you attach a continuation sheet.

3.03 CBI

a. Circle all applicable containers used to transport the listed substance to your facility.

[ ]

Bags 1

Boxes 2

Free standing tank cylinders 3

Tank rail cars 4

Hopper cars 5

Tank trucks ..... (6)

Hopper trucks 7

Drums 8

Pipeline 9

Other (specify) _____ 10

b. If the listed substance is transported in pressurized tank cylinders, tank rail cars, or tank trucks, state the pressure of the tanks.

Tank cylinders ..... _____ mmHg

Tank rail cars ..... _____ mmHg

Tank trucks ..... 5 1 8 mmHg

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RAW MATERIAL IN THE FORM OF A MIXTURE

3.04 If you obtain the listed substance in the form of a mixture, list the trade name(s) of the mixture, the name of its supplier(s) or manufacturer(s), an estimate of the CBI average percent composition by weight of the listed substance in the mixture, and the amount of mixture processed during the reporting year.

[ ]

Trade Name	Supplier or Manufacturer	Average % Composition by Weight (specify ± % precision)	Amount Processed (kg/yr)
Rubinate TDI	I C I Polyurethanes	100% ±0.3%	9 2, 8 4 8

[ ] Mark (X) this box if you attach a continuation sheet.

PART C RAW MATERIAL VOLUME

3.05 CBI [ ] State the quantity of the listed substance used as a raw material during the reporting year in the form of a class I chemical, class II chemical, or polymer, and the percent composition, by weight, of the listed substance.

	Quantity Used (kg/yr)	% Composition by Weight of Listed Substance in Raw Material (specify ± % precision)
Class I chemical	92,848	100% ± .1%
Class II chemical		
Polymer		

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 4 PHYSICAL/CHEMICAL PROPERTIES

General Instructions:

If you are reporting on a mixture as defined in the glossary, reply to questions in Section 4 that are inappropriate to mixtures by stating "NA -- mixture."

For questions 4.06-4.15, if you possess any hazard warning statement, label, MSDS, or other notice that addresses the information requested, you may submit a copy or reasonable facsimile in lieu of answering those questions which it addresses.

PART A PHYSICAL/CHEMICAL DATA SUMMARY

4.01 Specify the percent purity for the three major[1] technical grade(s) of the listed substance as it is manufactured, imported, or processed. Measure the purity of the substance in the final product form for manufacturing activities, at the time you import the substance, or at the point you begin to process the substance.

CBI

[ ]

	Manufacture	Import	Process
Technical grade #1	N / A % purity	N / A % purity	99+ % purity
Technical grade #2	_____ % purity	_____ % purity	N / A % purity
Technical grade #3	_____ % purity	_____ % purity	_____ % purity

[1]Major = Greatest quantity of listed substance manufactured, imported or processed.

4.02 Submit your most recently updated Material Safety Data Sheet (MSDS) for the listed substance, and for every formulation containing the listed substance. If you possess an MSDS that you developed and an MSDS developed by a different source, submit your version. Indicate whether at least one MSDS has been submitted by circling the appropriate response.

Yes ..... (1)

No 2

Indicate whether the MSDS was developed by your company or by a different source.

Your company 1

Another source ..... (2)

[XX] Mark (X) this box if you attach a continuation sheet.

4.03 Submit a copy or reasonable facsimile of any hazard information (other than an MSDS) that is provided to your customers/users regarding the listed substance or any formulation containing the listed substance. Indicate whether this information has been submitted by circling the appropriate response.

Yes 1

No ..... (2)

4.04 For each activity that uses the listed substance, circle all the applicable number(s) corresponding to each physical state of the listed substance during the activity listed. Physical states for importing and processing activities are determined at the time you import or begin to process the listed substance. Physical states for manufacturing, storage, disposal and transport activities are determined using the final state of the product.

CBI

[ ]

	Physical State				
Activity	Solid	Slurry	Liquid	Liquified Gas	Gas
Manufacture	1	2	3	4	5
Import	1	2	3	4	5
Process	1	2	(3)	4	5
Store	1	2	(3)	4	5
Dispose	1	2	3	4	5
Transport	1	2	3	4	5

[ ] Mark (X) this box if you attach a continuation sheet.

4.05 Particle Size -- If the listed substance exists in particulate form during any of the following activities, indicate for each applicable physical state the size and the percentage distribution of the listed substance by activity. Do not include particles ≥10 microns in diameter. Measure the physical state and particle sizes for importing and processing activities at the time you import or begin to process the listed substance. Measure the physical state and particle sizes for manufacturing storage, disposal and transport activities using the final state of the product.

CBI

[ ]

Physical State		Manufacture	Import	Process	Store	Dispose	Transport
Dust	<1 micron	N / A	N / A	N / A	N / A	N / A	N / A
	1 to <5 microns						
	5 to <10 microns						
Powder	<1 micron	N / A	N / A	N / A	N / A	N / A	N / A
	1 to <5 microns						
	5 to <10 microns						
Fiber	<1 micron	N / A	N / A	N / A	N / A	N / A	N / A
	1 to <5 microns						
	5 to <10 microns						
Aerosol	<1 micron	N / A	N / A	N / A	N / A	N / A	N / A
	1 to <5 microns						
	5 to <10 microns						

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 5 ENVIRONMENTAL FATE

PART A RATE CONSTANTS AND TRANSFORMATION PRODUCTS

5.01 Indicate the rate constants for the following transformation processes.

a. Photolysis:

Absorption spectrum coefficient (peak) .... U K (1/M cm) at _____ nm

Reaction quantum yield, ϕ ..... U K at _____ nm

Direct photolysis rate constant, k_p, at ... U K 1/hr _____ latitude

b. Oxidation constants at 25°C:

For $^1O_2$ (singlet oxygen), k_{ox} ..... U K 1/M hr

For RO_2 (peroxy radical), k_{ox} ..... U K 1/M hr

c. Five-day biochemical oxygen demand, BOD_5 ... U K mg/l

d. Biotransformation rate constant:

For bacterial transformation in water, k_b... U K 1/hr

Specify culture ..... U K

e. Hydrolysis rate constants:

For base-promoted process, k_B ..... U K 1/M hr

For acid-promoted process, k_A ..... U K 1/M hr

For neutral process, k_N ..... U K 1/hr

f. Chemical reduction rate (specify conditions) U K

g. Other (such as spontaneous degradation) ... U K

[ ] Mark (X) this box if you attach a continuation sheet.

PART B PARTITION COEFFICIENTS

5.02 a. Specify the half-life of the listed substance in the following media.

Media	Half-life (specify units)
Groundwater	U K
Atmosphere	U K
Surface water	U K
Soil	U K

b. Identify the listed substance's known transformation products that have a half-life greater than 24 hours.

CAS No.	Name	Half-life (specify units)	Media
U K			in
			in
			in
			in

5.03 Specify the octanol-water partition coefficient, K_{ow} ... U K at 25°C

Method of calculation or determination .....

5.04 Specify the soil-water partition coefficient, K_d ..... U K at 25°C

Soil type .....

5.05 Specify the organic carbon-water partition coefficient, K_{oc} ..... U K at 25°C

5.06 Specify the Henry's Law Constant, H ..... U K atm-m^3/mole

[ ] Mark (X) this box if you attach a continuation sheet.

5.07 List the bioconcentration factor (BCF) of the listed substance, the species for which it was determined, and the type of test used in deriving the BCF.

Bioconcentration Factor	Species	Test[1]
U K		

[1]Use the following codes to designate the type of test:

F = Flowthrough
S = Static

[ ] Mark (X) this box if you attach a continuation sheet.

6.04 CBI [ ] For each market listed below, state the quantity sold and the total sales value of the listed substance sold or transferred in bulk during the reporting year.

Market	Quantity Sold or Transferred (kg/yr)	Total Sales Value ($/yr)
Retail sales		
Distribution -- Wholesalers		
Distribution -- Retailers		
Intra-company transfer		
Repackagers		
Mixture producers		
Article producers		
Other chemical manufacturers or processors		
Exporters		
Other (specify)		
_____		

6.05 CBI [ ] Substitutes -- List all known commercially feasible substitutes that you know exist for the listed substance and state the cost of each substitute. A commercially feasible substitute is one which is economically and technologically feasible to use in your current operation, and which results in a final product with comparable performance in its end uses.

Substitute	Cost ($/kg)
U K	

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 7 MANUFACTURING AND PROCESSING INFORMATION

General Instructions:

For questions 7.04-7.06, provide a separate response for each process block flow diagram provided in questions 7.01, 7.02, and 7.03. Identify the process type from which the information is extracted.

PART A MANUFACTURING AND PROCESSING PROCESS TYPE DESCRIPTION

7.01 In accordance with the instructions, provide a process block flow diagram showing the major (greatest volume) process type involving the listed substance.

CBI

[ ] Process type ..... Foam Production

[XX] Mark (X) this box if you attach a continuation sheet.

7.03 In accordance with the instructions, provide a process block flow diagram showing all process emission streams and emission points that contain the listed substance and which, if combined, would total at least 90 percent of all facility emissions if not treated before emission into the environment. If all such emissions are released from one process type, provide a process block flow diagram using the instructions for question 7.01. If all such emissions are released from more than one process type, provide a process block flow diagram showing each process type as a separate block.

CBI

[ ] Process type ..... Foam Production

[X] Mark (X) this box if you attach a continuation sheet.

7.04 Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Manufacturing

Unit Operation ID Number	Typical Equipment Type	Operating Temperature Range (°C)	Operating Pressure Range (mm Hg)	Vessel Composition
7.1	Storage Tank	Ambient	5 1 8	Steel
7.2	Air Dryer	N / A	N / A	N / A
7.3	Vent	Ambient	Atmospheric	Steel
7.4	T D I Filter	Ambient	1 8 1 2	Steel
7.5	Pump	Ambient	1 8 1 2	Cast Iron
7.6	Process Tank	Ambient	5 1 8	Steel
7.7	Vent	Ambient	Atmospheric	Steel
7.8	Pump	Ambient	1 8 1 2	Cast Iron
7.9	Hear Exchanger	10°	1812	Steel
7.10	Vent	Ambient	Atmospheric	Steel

[XX] Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
7A	T D I	OL	92,848
7B	Polyol	OL	137,779
7C	Amine Catalyst	OL	1474
7D	Flame Retardant	OL	2204
7E	Tin Catalyst	OL	7
7F	Silicone	OL	1653
7G	Water	AL	4133
7H	T D I	OL	92,848

[1]Use the following codes to designate the physical state for each process stream:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[XX] Mark (X) this box if you attach a continuation sheet.

7.06 Characterize each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the CBI instructions for further explanation and an example.)

[ ] Process type ..... Foam Production

a. Process Stream ID Code	b. Known Compounds[1]	c. Concentrations[2,3] (% or ppm)	d. Other Expected Compounds	e. Estimated Concentrations (% or ppm)
7A	T D I	99.9%(E)(W)	U K	U K
7B	Polyol	100%(E)(W)	N / A	N / A
7C-7F	Additive Package 1	N / A	N / A	N / A

7.06 continued below

[XX] Mark (X) this box if you attach a continuation sheet.

7.06 (continued)

[1]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column b. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1	Amine Catalyst	28% (E)(W)
	Flame Retardant	41% (E)(W)
	Tin Catalyst	0.1%(E)(W)
XXXXXX2XXXXXX	Silicone	31% (E)(W)
3		
4		
5		

[2]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

[3]Use the following codes to designate how the concentration was measured:

V = Volume
W = Weight

[ ] Mark (X) this box if you attach a continuation sheet.

PART A RESIDUAL TREATMENT PROCESS DESCRIPTION

8.01 In accordance with the instructions, provide a residual treatment block flow diagram which describes the treatment process used for residuals identified in question 7.01.

CBI

[ ] Process type ..... Foam Production

[XX] Mark (X) this box if you attach a continuation sheet.

PART B RESIDUAL GENERATION AND CHARACTERIZATION

8.05 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process
CBI type. (Refer to the instructions for further explanation and an example.)

[ ] Process type ..... Foam Production

a. Stream ID Code	b. Type of Hazardous Waste[1]	c. Physical State of Residual[2]	d. Known Compounds[3]	e. Concentrations (% or ppm)[4,5,6]	f. Other Expected Compounds	g. Estimated Concentrations (% or ppm)
8A	N / A	OL	T D I	38.7% (E)(W)	N / A	N / A
			Polyol	57.4% (E)(W)	N / A	N / A
			Add. Pack 1	2.2% (E)(W)	N / A	N / A
			Water	1.7% (E)(W)	N / A	N / A
8B	N / A	GC	T D I	U K	U K	U K

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[1]Use the following codes to designate the type of hazardous waste:

I = Ignitable
C = Corrosive
R = Reactive
E = EP toxic
T = Toxic
H = Acutely hazardous

[2]Use the following codes to designate the physical state of the residual:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[3]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column d. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1	Amine Catalyst	28% (E)(W)
	Flame Retardant	41% (E)(W)
	Tin Catalyst	0.1% (E)(W)
XXXXXXXX	Silicone	31% (E)(W)
3		
4		
5		

[4]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[5]Use the following codes to designate how the concentration was measured:

V = Volume
W = Weight

[6]Specify the analytical test methods used and their detection limits in the table below. Assign a code to each test method used and list those codes in column e.

Code	Method	Detection Limit (± ug/l)
1	N / A	
2		
3		
4		
5		
6		

[ ] Mark (X) this box if you attach a continuation sheet.

8.06 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the instructions for further explanation and an example.)

CBI

[ ] Process type ..... Foam Production

a. Stream ID Code	b. Waste Description Code[1]	c. Management Method Code[2]	d. Residual Quantities (kg/yr)	e. Management of Residual (%) On-Site	e. Management of Residual (%) Off-Site	f. Costs for Off-Site Management (per kg)	g. Changes in Management Methods
8A	N / A	N / A	0	N / A	N / A	N / A	N / A
8B	B91 B57	M 5	N / A	N / A	N / A	N / A	N / A

[1]Use the codes provided in Exhibit 8-1 to designate the waste descriptions

[2]Use the codes provided in Exhibit 8-2 to designate the management methods

[ ] Mark (X) this box if you attach a continuation sheet.

8.22 Describe the combustion chamber design parameters for each of the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual treatment block flow diagram(s).

CBI

[ ]

Incinerator	Combustion Chamber Temperature (°C)		Location of Temperature Monitor		Residence Time In Combustion Chamber (seconds)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
1						
2						
3						

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes 1

No 2

8.23 Complete the following table for the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual treatment block flow diagram(s).

CBI

[ ]

Incinerator	Air Pollution Control Device[1]	Types of Emissions Data Available
1	N / A	N / A
2		
3		

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes 1

No 2

[1]Use the following codes to designate the air pollution control device:

S = Scrubber (include type of scrubber in parenthesis)
E = Electrostatic precipitator
O = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 9 WORKER EXPOSURE

General Instructions:

Questions 9.03-9.25 apply only to those processes and workers involved in manufacturing or processing the listed substance. Do not include workers involved in residual waste treatment unless they are involved in this treatment process on a regular basis (i.e., exclude maintenance workers, construction workers, etc.).

[ ] Mark (X) this box if you attach a continuation sheet.

PART A EMPLOYMENT AND POTENTIAL EXPOSURE PROFILE

9.01 Mark (X) the appropriate column to indicate whether your company maintains records on the following data elements for hourly and salaried workers. Specify for each data element the year in which you began maintaining records and the number of years the CBI records for that data element are maintained. (Refer to the instructions for further explanation and an example.)

[ ]

Data Element	Data are Maintained for: Hourly Workers	Salaried Workers	Year in Which Data Collection Began	Number of Years Records Are Maintained
Date of hire	XX	XX	1962	Indefinately
Age at hire	XX	XX	1962	Indefinately
Work history of individual before employment at your facility	XX	XX	1962	Indefinately
Sex	XX	XX	1962	Indefinately
Race	XX	XX	1962	Indefinately
Job titles	XX	XX	1962	Indefinately
Start date for each job title	XX	XX	1962	Indefinately
End date for each job title	XX	XX	1962	Indefinately
Work area industrial hygiene monitoring data	N / A	N / A	N / A	N / A
Personal employee monitoring data	N / A	N / A	N / A	N / A
Employee medical history	XX	XX	1962	Indefinately
Employee smoking history	N / A	N / A	N / A	N / A
Accident history	XX	XX	1962	Indefinately
Retirement date	XX	XX	1962	Indefinately
Termination date	XX	XX	1962	Indefinately
Vital status of retirees	N / A	N / A	N / A	N / A
Cause of death data	N / A	N / A	N / A	N / A

[ ] Mark (X) this box if you attach a continuation sheet.

9.02 In accordance with the instructions, complete the following table for each activity in which you engage.

CBI

[ ]

a. Activity	b. Process Category	c. Yearly Quantity (kg)	d. Total Workers	e. Total Worker-Hours
Manufacture of the listed substance	Enclosed	N / A		
	Controlled Release			
	Open			
On-site use as reactant	Enclosed			
	Controlled Release	92,848	4	8000
	Open			
On-site use as nonreactant	Enclosed	N / A		
	Controlled Release			
	Open			
On-site preparation of products	Enclosed	N / A		
	Controlled Release			
	Open			

[ ] Mark (X) this box if you attach a continuation sheet.

9.03 Provide a descriptive job title for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance.

CBI

[ ]

Labor Category	Descriptive Job Title
A	Mold Preparer/Tank Farm Operator
B	Foam Machine Operator
C	Mold Preparer
D	Supervisor
E	Mold Sprayer
F	Demolder
G	Trimmer
H	Material Supplier
I	Fabricator
J	Sewer

[XX] Mark (X) this box if you attach a continuation sheet.

9.04 **In accordance with the instructions, provide your process block flow diagram(s) and indicate associated work areas.**

CBI

[ ] **Process type .....** Foam Production

[XX] **Mark (X) this box if you attach a continuation sheet.**

9.05 Describe the various work area(s) shown in question 9.04 that encompass workers who may potentially come in contact with or be exposed to the listed substance. Add any additional areas not shown in the process block flow diagram in question 7.01 or 7.02. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Work Area ID	Description of Work Areas and Worker Activities
1	Pumping systems, raw material storage, foam machine controls (Workers operate foam machine and prepare Resin)
2	Reaction zone, Demolding area, mold preparation area (Workers remove hot foam from molds and prepare molds for loading)
3	Crusher area and trimming area ~~(Workers trim foam, sew and glue foam to upholstery fabric)~~
4	Overhead curing conveyer area, foam packing, Quality control lab ~~(Workers package foam, and test foam for quality assurance~~.)
5	
6	
7	
8	
9	
10	

[ ] Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question
CBI and complete it separately for each process type and work area.

[ ] Process type ..... Foam Production

Work area 1

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance[1]	Average Length of Exposure Per Day[2]	Number of Days per Year Exposed
A,B,D	3	Skin contact	OL	N / A	N / A
A,B,C,D	4	Inhalation	GU	E	243

[1]Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure; includes fumes, vapors, etc.)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[2]Use the following codes to designate average length of exposure per day:

A = 15 minutes or less
B = Greater than 15 minutes, but not exceeding 1 hour
C = Greater than one hour, but not exceeding 2 hours
D = Greater than 2 hours, but not exceeding 4 hours
E = Greater than 4 hours, but not exceeding 8 hours
F = Greater than 8 hours

[XX] Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 1

Labor Category	8-hour TWA Exposure Level (ppm, mg/m^3, other-specify)	15-Minute Peak Exposure Level (ppm, mg/m^3, other-specify)
A,B,C,D	$< 0.006 mg/m^3$	U K

[XX] Mark (X) this box if you attach a continuation sheet.

PART B WORK PLACE MONITORING PROGRAM

9.08 If you monitor worker exposure to the listed substance, complete the following table.

CBI

[ ]

Sample/Test	Work Area ID	Testing Frequency (per year)	Number of Samples (per test)	Who Samples[1]	Analyzed In-House (Y/N)	Number of Years Records Maintained
Personal breathing zone	1	1/2yr	U K	B	N	Indefinately
General work area (air)	1	1/2yr	U K	B	N	Indefinately
Wipe samples	N / A					
Adhesive patches	N / A					
Blood samples	N / A					
Urine samples	N / A					
Respiratory samples	1	1/yr	U K	D	N	Indefinately
Allergy tests	N / A					
Other (specify)						
Chest X-ray	1	1/yr	U K	D	N	Indefinately
Other (specify)						
Other (specify)						

[1]Use the following codes to designate who takes the monitoring samples:

A = Plant industrial hygienist
B = Insurance carrier
C = OSHA consultant
D = Other (specify) Local Hospital

[ ] Mark (X) this box if you attach a continuation sheet.

9.09 For each sample type identified in question 9.08, describe the type of sampling and analytical methodology used for each type of sample.

CBI

[ ]	Sample Type	Sampling and Analytical Methodology
	Personal Breathing Zone	Gravimetric dust sampler with attachable filter for T D I
	General Work Area	Gravimatric dust sampler with attachable filter for T D I

9.10 If you conduct personal and/or ambient air monitoring for the listed substance, specify the following information for each equipment type used.

CBI

[ ]	Equipment Type[1]	Detection Limit[2]	Manufacturer	Averaging Time (hr)	Model Number
	N / A				

[1]Use the following codes to designate personal air monitoring equipment types:

A = Passive dosimeter
B = Detector tube
C = Charcoal filtration tube with pump
D = Other (specify) _____

Use the following codes to designate ambient air monitoring equipment types:

E = Stationary monitors located within work area
F = Stationary monitors located within facility
G = Stationary monitors located at plant boundary
H = Mobile monitoring equipment (specify) _____
I = Other (specify) _____

[2]Use the following codes to designate detection limit units:

A = ppm
B = Fibers/cubic centimeter (f/cc)
C = Micrograms/cubic meter (μ/m^3)

[ ] Mark (X) this box if you attach a continuation sheet.

9.11 If you conduct routine medical tests for monitoring the health effects of exposure to the listed substance, specify the type and frequency of the tests.

CBI

[ ]	Test Description	Frequency (weekly, monthly, yearly, etc.)
	~~Respiratory Test~~	~~Yearly~~
	Chest X-ray	Yearly

[ ] Mark (X) this box if you attach a continuation sheet.

PART C ENGINEERING CONTROLS

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 1

Engineering Controls	Used (Y/N)	Year Installed	Upgraded (Y/N)	Year Upgraded
Ventilation:				
Local exhaust	Y	1972	N	
General dilution	N			
Other (specify)				
	N			
Vessel emission controls	N			
Mechanical loading or packaging equipment	Y	1972	N	
Other (specify)				
	N			

[XX] Mark (X) this box if you attach a continuation sheet.

9.13 Describe all equipment or process modifications you have made within the 3 years prior to the reporting year that have resulted in a reduction of worker exposure to the listed substance. For each equipment or process modification described, state the percentage reduction in exposure that resulted. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... N / A

Work area .....

Equipment or Process Modification	Reduction in Worker Exposure Per Year (%)

[ ] Mark (X) this box if you attach a continuation sheet.

PART D PERSONAL PROTECTIVE AND SAFETY EQUIPMENT

9.14 Describe the personal protective and safety equipment that your workers wear or use in each work area in order to reduce or eliminate their exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 1

Equipment Types	Wear or Use (Y/N)
Respirators	N
Safety goggles/glasses	Y
Face shields	N
Coveralls	N
Bib aprons	Y
Chemical-resistant gloves	Y
Other (specify)	
_____	N
_____	

[XX] Mark (X) this box if you attach a continuation sheet.

9.15 If workers use respirators when working with the listed substance, specify for each process type, the work areas where the respirators are used, the type of respirators used, the average usage, whether or not the respirators were fit tested, and the type and frequency of the fit tests. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... N / A

Work Area	Respirator Type	Average Usage[1]	Fit Tested (Y/N)	Type of Fit Test[2]	Frequency of Fit Tests (per year)

[1]Use the following codes to designate average usage:

A = Daily
B = Weekly
C = Monthly
D = Once a year
E = Other (specify) _____

[2]Use the following codes to designate the type of fit test:

QL = Qualitative
QT = Quantitative

[ ] Mark (X) this box if you attach a continuation sheet.

PART E WORK PRACTICES

9.19 Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this
CBI question and complete it separately for each process type and work area.

[ ]

Process type ..... Foam Production

Work area 1,2,3,4

Worker Training Programs

9.20 Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

Process type ..... Foam Production

Work area 1,2,3,4

Housekeeping Tasks	Less Than Once Per Day	1-2 Times Per Day	3-4 Times Per Day	More Than 4 Times Per Day
Sweeping		XX		
Vacuuming	XX			
Water flushing of floors	XX			
Other (specify)				

[ ] Mark (X) this box if you attach a continuation sheet.

9.21 Do you have a written medical action plan for responding to routine or emergency exposure to the listed substance?

Routine exposure

Yes 1

No 2

Emergency exposure

Yes 1

No 2

If yes, where are copies of the plan maintained?

Routine exposure: _____

Emergency exposure: _____

9.22 Do you have a written leak and spill cleanup plan that addresses the listed substance? Circle the appropriate response.

Yes ..... (1)

No 2

If yes, where are copies of the plan maintained? Personnel, Emergency coordinator, Plant Chemist, Department offices.

Has this plan been coordinated with state or local government response organizations? Circle the appropriate response.

Yes ..... (1)

No 2

9.23 Who is responsible for monitoring worker safety at your facility? Circle the appropriate response.

Plant safety specialist 1

Insurance carrier 2

OSHA consultant 3

Other (specify) _____ 4

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 10 ENVIRONMENTAL RELEASE

General Instructions:

Complete Part E (questions 10.23-10.35) for each non-routine release involving the listed substance that occurred during the reporting year. Report on all releases that are equal to or greater than the listed substance's reportable quantity value, RQ, unless the release is federally permitted as defined in 42 U.S.C. 9601, or is specifically excluded under the definition of release as defined in 40 CFR 302.3(22). Reportable quantities are codified in 40 CFR Part 302. If the listed substance is not a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and, thus, does not have an RQ, then report releases that exceed 2,270 kg. If such a substance however, is designated as a CERCLA hazardous substance, then report those releases that are equal to or greater than the RQ. The facility may have answered these questions or similar questions under the Agency's Accidental Release Information Program and may already have this information readily available. Assign a number to each release and use this number throughout this part to identify the release. Releases over more than a 24-hour period are not single releases, i.e., the release of a chemical substance equal to or greater than an RQ must be reported as a separate release for each 24-hour period the release exceeds the RQ.

For questions 10.25-10.35, answer the questions for each release identified in question 10.23. Photocopy these questions and complete them separately for each release.

PART A GENERAL INFORMATION

10.01 Where is your facility located? Circle all appropriate responses.

CBI

[ ] Industrial area 1

Urban area ..... (2)

Residential area 3

Agricultural area ..... (4)

Rural area 5

Adjacent to a park or a recreational area 6

Within 1 mile of a navigable waterway ..... (7)

Within 1 mile of a school, university, hospital, or nursing home facility ..... (8)

Within 1 mile of a non-navigable waterway 9

Other (specify) _____ 10

[ ] Mark (X) this box if you attach a continuation sheet.

10.02 Specify the exact location of your facility (from central point where process unit is located) in terms of latitude and longitude or Universal Transverse Mercader (UTM) coordinates.

Latitude ..... 34 ° 37 ' 57 "

Longitude ..... 89 ° 57 ' 29 "

UTM coordinates ..... Zone _____, Northing _____, Easting _____

10.03 If you monitor meteorological conditions in the vicinity of your facility, provide the following information.

Average annual precipitation ..... _____ inches/year

Predominant wind direction ..... _____

10.04 Indicate the depth to groundwater below your facility.

Depth to groundwater ..... _____ meters

10.05 For each on-site activity listed, indicate (Y/N/NA) all routine releases of the listed substance to the environment. (Refer to the instructions for a definition of Y, N, and NA.)

CBI

[ ]

On-Site Activity	Environmental Release		
	Air	Water	Land
Manufacturing	N / A	N / A	N / A
Importing	N / A	N / A	N / A
Processing	Y	N	N
Otherwise used	N / A	N / A	N / A
Product or residual storage	Y	N	N
Disposal	N / A	N / A	N / A
Transport	N / A	N / A	N / A

[ ] Mark (X) this box if you attach a continuation sheet.

10.06 Provide the following information for the listed substance and specify the level of precision for each item. (Refer to the instructions for further explanation and an example.)

CBI

[ ]

Quantity discharged to the air	U K	kg/yr ± ____	%
Quantity discharged in wastewaters	N / A	kg/yr ± ____	%
Quantity managed as other waste in on-site treatment, storage, or disposal units	N / A	kg/yr ± ____	%
Quantity managed as other waste in off-site treatment, storage, or disposal units	N / A	kg/yr ± ____	%

[ ] Mark (X) this box if you attach a continuation sheet.

10.08 Describe the control technologies used to minimize release of the listed substance for each process stream containing the listed substance as identified in your process block or residual treatment block flow diagram(s). Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... N / A

Stream ID Code	Control Technology	Percent Efficiency

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RELEASE TO AIR

10.09 Point Source Emissions -- Identify each emission point source containing the listed substance in terms of a Stream ID Code as identified in your process block or residual treatment block flow diagram(s), and provide a description of each point source. Do not include raw material and product storage vents, or fugitive emission sources (e.g., equipment leaks). Photocopy this question and complete it separately for each process type.

CBI
[ ]

Process type ..... Foam Production

Point Source ID Code	Description of Emission Point Source
7N	Mixing Head Flush
7HH	Vent FAns for Reaction Zone
7II	Vent Fans for Curing Oven
7 JJ	Vent FAns for Demolding Area
7KK	Vent Fans for Crushers
7LL	Vent Fans for Curing Conveyer

[ ] Mark (X) this box if you attach a continuation sheet.

[ ] Mark (X) this box if you attach a continuation sheet.

10.10 Emission Characteristics - - Characterize the emissions for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

[ ]

Point Source ID Code	Physical State[1]	Average Emissions (kg/day)	Frequency[2] (days/yr)	Duration[3] (min/day)	Average Emission Factor[4]	Maximum Emission Rate (kg/min)	Maximum Emission Rate Frequency (events/yr)	Maximum Emission Rate Duration (min/event)
7N	V	U K	U K	U K	U K	U K	U K	U K
7HH	"	"	"	"	"	"	"	"
7II	"	"	"	"	"	"	"	"
7JJ	"	"	"	"	"	"	"	"
7KK	"	"	"	"	"	"	"	"
7LL	"	"	"	"	"	"	"	"

[1]Use the following codes to designate physical state at the point of release:
G = Gas; V = Vapor; P = Particulate; A = Aerosol; O = Other (specify) _____

[2]Frequency of emission at any level of emission

[3]Duration of emission at any level of emission

[4]Average Emission Factor — Provide estimated (± 25 percent) emission factor (kg of emission per kg of production of listed substance)

10.11 Stack Parameters -- Identify the stack parameters for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

[ ]

Point Source ID Code	Stack Height(m)	Stack Inner Diameter (at outlet) (m)	Exhaust Temperature (°C)	Emission Exit Velocity (m/sec)	Building Height(m)[1]	Building Width(m)[2]	Vent Type[3]
7N	U K	U K	U K	U K	U K	U K	U K
7HH	"	"	"	"	"	"	"
7II	"	"	"	"	"	"	"
7JJ	"	"	"	"	"	"	"
7KK	"	"	"	"	"	"	"
7LL	"	"	"	"	"	"	"

[1]Height of attached or adjacent building

[2]Width of attached or adjacent building

[3]Use the following codes to designate vent type:

H = Horizontal
V = Vertical

[ ] Mark (X) this box if you attach a continuation sheet.

10.12 If the listed substance is emitted in particulate form, indicate the particle size distribution for each Point Source ID Code identified in question 10.09. Photocopy this question and complete it separately for each emission point source.

CBI

[ ]

Point source ID code ..... N / A

Size Range (microns)	Mass Fraction (% ± % precision)
< 1	
≥ 1 to < 10	
≥ 10 to < 30	
≥ 30 to < 50	
≥ 50 to < 100	
≥ 100 to < 500	
≥ 500	

Total = 100%

[ ] Mark (X) this box if you attach a continuation sheet.

PART C FUGITIVE EMISSIONS

10.13 Equipment Leaks -- Complete the following table by providing the number of equipment types listed which are exposed to the listed substance and which are in service according to the specified weight percent of the listed substance passing through the component. Do this for each process type identified in your process block or residual treatment block flow diagram(s). Do not include equipment types that are not exposed to the listed substance. If this is a batch or intermittently operated process, give an overall percentage of time per year that the process type is exposed to the listed substance. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Percentage of time per year that the listed substance is exposed to this process type ..... _____ %

Equipment Type	Number of Components in Service by Weight Percent of Listed Substance in Process Stream					
	Less than 5%	5-10%	11-25%	26-75%	76-99%	Greater than 99%
Pump seals[1]						
Packed						
Mechanical						
Double mechanical[2]						2
Compressor seals[1]						
Flanges						10
Valves						
Gas[3]						
Liquid						7
Pressure relief devices[4] (Gas or vapor only)						3
Sample connections						
Gas						
Liquid						1
Open-ended lines[5] (e.g., purge, vent)						
Gas						
Liquid						1

[1]List the number of pump and compressor seals, rather than the number of pumps or compressors

10.13 continued on next page

[ ] Mark (X) this box if you attach a continuation sheet.

10.13 (continued)

[2]If double mechanical seals are operated with the barrier (B) fluid at a pressure greater than the pump stuffing box pressure and/or equipped with a sensor (S) that will detect failure of the seal system, the barrier fluid system, or both, indicate with a "B" and/or an "S", respectively

[3]Conditions existing in the valve during normal operation

[4]Report all pressure relief devices in service, including those equipped with control devices

[5]Lines closed during normal operation that would be used during maintenance operations

10.14 Pressure Relief Devices with Controls -- Complete the following table for those pressure relief devices identified in 10.13 to indicate which pressure relief devices in service are controlled. If a pressure relief device is not controlled, enter "None" under column c.

CBI

[ ]

a. Number of Pressure Relief Devices	b. Percent Chemical in Vessel[1]	c. Control Device	d. Estimated Control Efficiency[2]
N / A			

[1]Refer to the table in question 10.13 and record the percent range given under the heading entitled "Number of Components in Service by Weight Percent of Listed Substance" (e.g., <5%, 5-10%, 11-25%, etc.)

[2]The EPA assigns a control efficiency of 100 percent for equipment leaks controlled with rupture discs under normal operating conditions. The EPA assigns a control efficiency of 98 percent for emissions routed to a flare under normal operating conditions

[ ] Mark (X) this box if you attach a continuation sheet.

10.15 Equipment Leak Detection -- If a formal leak detection and repair program is in place, complete the following table regarding those leak detection and repair procedures. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... N / A

Equipment Type	Leak Detection Concentration (ppm or mg/m^3) Measured at ____ Inches from Source	Detection Device[1]	Frequency of Leak Detection (per year)	Repairs Initiated (days after detection)	Repairs Completed (days after initiated)
Pump seals					
Packed					
Mechanical					
Double mechanical					
Compressor seals					
Flanges					
Valves					
Gas					
Liquid					
Pressure relief devices (gas or vapor only)					
Sample connections					
Gas					
Liquid					
Open-ended lines					
Gas					
Liquid					

[1]Use the following codes to designate detection device:

POVA = Portable organic vapor analyzer
FPM = Fixed point monitoring
O = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

[ ] Mark (X) this box if you attach a continuation sheet.

10.16 Raw Material, Intermediate and Product Storage Emissions - - Complete the following table by providing the information on each liquid raw material, intermediate, and product storage vessel containing the listed substance as identified in your process block or residual treatment block flow diagram(s).

CBI

[ ]

Vessel Type[1]	Floating Roof Seals[2]	Composition of Stored Materials[3]	Throughput (liters per year)	Vessel Filling Rate (gpm)	Vessel Filling Duration (min)	Vessel Inner Diameter (m)	Vessel Height (m)	Operating Vessel Volume (l)	Vessel Emission Controls[4]	Design Flow Rate[5]	Vent Diameter (cm)	Control Efficiency (%)	Basis for Estimate[6]
P	N / A	100%	76,173	U K	U K	2.7	4.3	25600	N / A	N / A	7.6	U K	C
P	N / A	100%	76,173	U K	U K	1.5	2.4	10200	N / A	N / A	7.6	U K	C
P	N / A	100%	76,173	U K	U K	1.2	1.8	3100	N / A	N / A	7.6	U K	C
P	N / A	100%	76,173	U K	U K	1.2	1.2	1400	N / A	N / A	7.6	U K	C

[1]Use the following codes to designate vessel type:

F = Fixed roof
CIF = Contact internal floating roof
NCIF = Noncontact internal floating roof
EFR = External floating roof
P = Pressure vessel (indicate pressure rating)
H = Horizontal
U = Underground

[2]Use the following codes to designate floating roof seals:

MS1 = Mechanical shoe, primary
MS2 = Shoe-mounted secondary
MS2R = Rim-mounted, secondary
LM1 = Liquid-mounted resilient filled seal, primary
LM2 = Rim-mounted shield
LMW = Weather shield
VM1 = Vapor mounted resilient filled seal, primary
VM2 = Rim-mounted secondary
VMW = Weather shield

[3]Indicate weight percent of the listed substance. Include the total volatile organic content in parenthesis

[4]Other than floating roofs

[5]Gas/vapor flow rate the emission control device was designed to handle (specify flow rate units)

[6]Use the following codes to designate basis for estimate of control efficiency:

C = Calculations
S = Sampling

APPENDIX I: List of Continuation Sheets

Attach continuation sheets for sections of this form and optional information after this page. In column 1, clearly identify the continuation sheet by listing the question number to which it relates. In column 2, enter the inclusive page numbers of the continuation sheet for each question number.

Question Number (1)	Continuation Sheet Page Numbers (2)
4.02	1 - 16
7.01	17
7.03	18
7.04	19 - 21
7.05	22 - 25
7.06	26 - 27
8.01	28
9.03	29
9.04	30A
9.06	30 - 32
9.07	33 - 35
9.12	36 - 38
9.14	39

[ ] Mark (X) this box if you attach a continuation sheet.

MATERIAL SAFETY DATA SHEET

ICI Polyurethanes Group
West Deptford, New Jersey 08066
Phone, 24 hours: (302) 575-3000
Medical inquiries: (800) 327-8633

2290

07080R
Rev.: F
Date: 02/06/89

SECTION 1 NAME & HAZARD SUMMARY

Material name: RUBINATE TDI

Hazard summary (as defined by OSHA Hazard Comm. Std., 29 CFR 1910.1200):
Physical hazards: Unstable.
Health hazards: Corrosive (eye), irritant (skin, respiratory passages, skin sensitizer), inhalation (TLV), harmful pulmonary (lung) sensitizer. Based on TDI - harmful (respiratory sensitizer, lung injury).

Read the entire MSDS for a more thorough evaluation of the hazards.

SECTION 2 INGREDIENTS

	%	TLV (ACGIH)
Toluene diisocyanate, 2,4-isomer (CAS 584-84-9)	80	0.005 ppm
Toluene diisocyanate, 2,6-isomer (CAS 91-08-7)	20	Not listed

Ingredients not precisely identified are proprietary or nonhazardous. Values are not product specifications.

SECTION 3 PHYSICAL DATA

Appearance and odor: Clear, colorless liquid with sharp odor
Boiling point: 484°F, 251.1°C
Vapor pressure (mm Hg at 20°C): 0.02
Vapor density (air = 1): 6.0
Solubility in water: Reacts
pH: No data
Specific gravity: 1.22
% Volatile by volume: No data

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

Flash point: 270°F, 132°C (OC)
Autoignition temperature: No data
Flammable limits (STP): 0.9-9.5%

Extinguishing media:
Dry chemical, foam, carbon dioxide, halogenated agents. If water is used, use very large quantities. The reaction between water and hot isocyanate may be vigorous.

Special fire fighting protective equipment:
Self-contained breathing apparatus with full facepiece and protective clothing.

SECTION 4 FIRE AND EXPLOSION HAZARD DATA (continued)

Unusual fire and explosion hazards:

Water contamination will produce carbon dioxide. Do not reseal contaminated containers as pressure buildup may rupture them.

SECTION 5 REACTIVITY DATA

Stability:

Stable under normal conditions.

Incompatibility:

This product will react with any materials containing active hydrogens, such as water, alcohol, ammonia, amines, alkalies and acids. The reaction with water is very slow under 50°C, but is accelerated at higher temperatures and in the presence of alkalies, tertiary amines, and metal compounds. Some reactions can be violent.

Hazardous decomposition products:

Combustion products: Carbon dioxide, carbon monoxide. Nitrogen oxides, ammonia. Trace amounts of hydrogen cyanide.

Hazardous polymerization:

May occur. High temperatures in the presence of alkalies, tertiary amines, and metal compounds will accelerate polymerization. Possible evolution of carbon dioxide gas may rupture closed containers.

SECTION 6 HEALTH HAZARD ASSESSMENT

General:

The health hazard assessment is based on an evaluation of the chemical composition together with information from a search of the scientific literature and other commercial sources.

Ingestion:

The acute oral LD50 in rat is reported to be 5,800 mg/kg. Relative to other materials, this material is classified as "practically nontoxic" by ingestion. In humans, irritation or chemical burns of the mouth, pharynx, esophagus and stomach can develop following ingestion. Injury may be severe and cause death.

Eye contact:

This material is reported to induce chemical burns in rabbit eye studies; a similar degree of eye injury may develop after contact with human eyes.

Skin contact:

This material is reported to be severely irritating in rabbit dermal irritation studies and will probably irritate human skin. Skin sensitization and irritation may develop after repeated and/or prolonged contact with human skin.

Skin absorption:

The acute dermal LD_{50} in rabbit is reported to be above 16 g/kg. Systemically toxic concentrations of this product will probably not be absorbed through human skin.

SECTION 6 HEALTH HAZARD ASSESSMENT (continued)

Inhalation:

Vapors and aerosols can irritate eyes, nose and respiratory passages. TDI vapors are easily generated and are lethal to rats via inhalation at concentrations below 10 ppm. A no effect level for rats of about 0.1 ppm was determined from a subacute study. This and other data indicate the vapors and aerosols of TDI are highly toxic relative to the vapors of other compounds. Vapors and aerosols of TDI strongly irritate the upper and lower respiratory tract. Human experience indicates that TDI will induce an asthma-like respiratory sensitization in some individuals. If applications which involve spraying (e.g. aerosols and mists) or if elevated temperatures are used, even higher vapor concentrations may result and introduce a greater degree of risk of inhalation injury. Rat and mouse toxicity and carcinogenicity studies were conducted with two years of inhalation exposure to vapors of TDI at concentrations of 0.05 and 0.15 ppm. No indication of carcinogenic effect was observed. However, mice exposed to 0.15 ppm for two years showed reduced weight gain and signs of irritation in the upper and lower respiratory tract. No other effect of toxicological significance was observed.

Other effects of overexposure:

There are two studies which allege that workers exposed to TDI at or near the current TLV have experienced impaired ventilatory capacities. These findings have not been independently substantiated. The National Toxicology Program (NTP) 4th Annual Report on Carcinogens (1985) lists TDI as a substance that may reasonably be anticipated to be a carcinogen based on a NTP Technical Report. In the cited study, laboratory animals gavaged TDI in corn oil developed cancer. In our view, the inhalation study is of more potential biological relevance to man.

First aid procedures:

Skin: Wash material off of the skin with plenty of soap and water. If redness, itching, or a burning sensation develops, get medical attention. Wash contaminated clothing and decontaminate footwear before reuse.

Eyes: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Have eyes examined and treated by medical personnel.

Ingestion: Do not induce vomiting. Give 1 or 2 glasses of water to drink and refer person to medical personnel. (Never give anything by mouth to an unconscious person.)

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is labored, give oxygen. Consult medical personnel.

Note to physician: Probable mucosal damage may contraindicate the use of gastric lavage following ingestion.

SECTION 7 SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Wear skin, eye, and respiratory protection during cleanup. Soak up material with absorbent and shovel into a chemical waste container. Cover container, but do not seal, and remove from work area. Prepare a decontamination solution of 0.2-5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material safety data sheets. All operations should be performed by trained personnel familiar with the hazards of the chemicals used. Treat the spill area with the decontamination solution, using about 10 parts of solution for each part of the spill, and allow it to react for at least 10 minutes. Carbon dioxide will be evolved, leaving insoluble polyureas. For major spills, call CHEMTREC (Chemical Transportation Emergency Center) at 800-424-9300.

Disposal method:

Slowly stir the isocyanate waste into the decontamination solution described above using 10 parts of the solution for each part of the isocyanate. Let stand for 48 hours, allowing the evolved carbon dioxide to vent away. Neutralize the waste. Neither the solid nor the liquid portion is a hazardous waste under RCRA, 40 CFR 261.

Container disposal:

Drums must be decontaminated in properly ventilated areas by personnel protected from the inhalation of isocyanate vapors. Spray or pour 5-15 liters of decontaminating solution into the drum, making sure the walls are well rinsed. Leave the drum soaking unsealed for 48 hours. Pour out the decontaminating solution and triple rinse the empty container. Puncture or otherwise destroy the rinsed container before disposal.

SECTION 8 SPECIAL PROTECTION INFORMATION

TLV® or suggested control value:

The ACGIH TLV, OSHA PEL, and NIOSH recommendation for TDI is 0.005 ppm 8-hour TWA, 0.02 ppm STEL.

Ventilation:

If needed, use local exhaust ventilation to keep airborne concentrations below the TLV. Follow guidelines in the ACGIH publication "Industrial Ventilation". Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination.

Respiratory protection:

Because of the low vapor pressure, ventilation is usually sufficient to keep vapors below the TLV at room temperatures. Exceptions are when the material is sprayed or heated. If airborne concentrations exceed or are expected to exceed the TLV, use MSHA/NIOSH approved positive pressure supplied air respirator with a full facepiece or an air supplied hood. For emergencies, use a positive pressure self-contained breathing apparatus. Air purifying (cartridge type) respirators are not approved for protection against isocyanates.

SECTION 8 SPECIAL PROTECTION INFORMATION (continued)

Protective clothing:

Gloves determined to be impervious under the conditions of use. Depending on conditions of use, additional protection may be required such as apron, arm covers, or full body suit. Wash contaminated clothing before rewearing. The literature indicates that clothing constructed of butyl rubber, Viton, Silver Shield, Saranex coated Tyvek, as well as some nitrile rubber and polyvinyl alcohol (PVA) coated garments have excellent resistance to permeation by TDI. Clothing constructed of Teflon, as well as some garments constructed of nitrile rubber, natural rubber and PVA exhibited limited resistance to permeation by TDI. Some clothing constructed of natural rubber or polyethylene exhibited little resistance to permeation by TDI. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.

Eye protection:

Chemical tight goggles and full faceshield.

Other protective equipment:

Eyewash station and safety shower in work area.

SECTION 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS

Special precautions or other comments:

Prevent skin and eye contact. Observe TLV limitations. Avoid breathing vapors or aerosols. Workers should shower and change to fresh clothing after each shift. A sensitized individual should not be exposed to the product which caused the sensitization. Store in tightly sealed containers to protect from atmospheric moisture. Store in a cool area. Individuals with existing respiratory disease such as chronic bronchitis, emphysema or asthma should not be exposed to isocyanates. These individuals should be identified through baseline and annual evaluation and removed from further exposure. Medical examination should include medical history, vital capacity, and forced expiratory volume at one second.

SECTION 10 REGULATORY INFORMATION

TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710:

All ingredients are on the TSCA Section 8(b) Inventory.

CERCLA and SARA Regulations (40 CFR 355, 370, and 372):

Section 313 Supplier Notification. This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: 100% TDI (CAS 584-84-9 and 91-08-7).

State Regulations:

California Proposition 65: No warnings are necessary.

Polyurethanes

Rubinate® TDI 80/20

Toluene Diisocyanate (80/20 Isomer Ratio)

RB-13 Rev.

DESCRIPTION

Rubinate TDI 80/20 (Toluene Diisocyanate) is a mixture of the 2,4- and 2,6- isomers of toluene diisocyanate. It is a purified, solids-free product with a water white to pale yellow color and a functionality of 2. It has a sharp, pungent odor and requires handling precautions described below and in the Advisory Bulletin "Safety, Storage and Handling Procedures for Rubinate TDI 80/20 Toluene Diisocyanate."

TYPICAL PROPERTIES AS SHIPPED

Isocyanate Equivalent Weight	87
NCO Content, %	48.3
Assay (Toluene Diisocyanate), %	99.7 Min.
Acidity, % as HCl Type 1	.001 to .004
Type 2	.009 to .011
Viscosity at 25°C (77°F) cps	3.10
at 50°C (122°F) cps	1.74
at 100°C (212°F) cps	.70
Color	Water White to Pale Yellow
Specific Gravity at 25°C (77°F)	1.22
Flash Point (Cleveland Open Cup) °C (°F)	132 (270)
Vapor Pressure, mm Hg at 25°C	0.02

REGISTRY NUMBERS

EPA No. B726-3966
CHEM. ABS. No. 26471-62-5

APPLICATIONS

Rubinate TDI 80/20 is used in the manufacture of flexible polyurethane foams, elastomers, coatings, caulks and sealants. Ask your ICI Polyurethanes Group sales representative for specific end use applications.

SAFETY PRECAUTIONS

All isocyanates are potentially hazardous materials and require extreme care inhandling. It is essential that all persons involved with the handling of these products be familiar with the proper safety and handling procedures.

HEALTH CONSIDERATIONS

Rubinate TDI 80/20 (toulene diisocyanate) is a liquid at ambient temperature. At these temperatures, Rubinate TDI has a relatively high vapor pressure and a vapor hazard exists. In the absence of adequate ventilation, it is likely to exceed recommended control limits.

The current OSHA Permissible Exposure Limit (PEL) for toulene 2,4-diisocyanate (TDI) is 0.02 ppm as a ceiling value (not to be exceeded at any time). The ACGIH Threshold Limit Value (TLV) for TDI is 0.005 ppm 8 hour TWA and 0.02 ppm Short Term Exposure Limit (STEL), NIOSH recommends a 0.05 ppm 8 hour TWA and a 10 minute 0.02 ppm ceiling limit. Presonnel who may be exposed to isocyanate vapors above the TLV must wear an air-fed hood or approved respirator to avoid overexposure. Repeated inhalation of the vapor at low levels above the TLV could cause serious respiratory problems.

Rubinate TDI 80/20 is a reactive chemical and great care must be taken when handling it to prevent ingestion, or contact with the skin and eyes. The use of goggles or face shield, PVC or rubber gloves and apron will reduce chances of injury from contact with the product.

If splashes accidentally reach the eyes, immediately flush the eyes with plenty of water for at least 15 minutes and call a physician. Wash any material from the skin with soap and plenty of water. Immediately remove any contaminated clothing or shoes. If redness, itching or a burning sensation develops after exposure, or following repeated or prolonged skin contact, seek medical attention. Wash clothing and decontaminate shoes before reuse. If ingestion occurs, do not induce vomiting. Administer large amounts of milk or water and contact a physician. If irritation or respiratory problems develop after inhalation of TDI, get to fresh air and seek medical attention. TDI may

induce acute irritant reactions or hypersensitivity reactions such as asthma-like respiration responses, in exposed persons. These reactions may be delayed for up to several hours after exposure. Persons previously sensitized to TDI should be removed from all exposure.

Reactivity Considerations: **Rubinate TDI 80/20** is an organic isocyanate and, as such, requires care in handling because it reacts with water and organic compounds containing active hydrogen groups. Because the reaction of **Rubinate TDI 80/20** with water produces carbon dioxide gas, containers that have become contaminated with moisture should not be subsequently sealed; otherwise, a hazardous increase in pressure may result.

For additional safety and health information, refer to the Advisory Bulletin "Safety, Storage and Handling Procedures for Rubinate TDI 80/20 Toluene Diisocyanate," as well as the Material Safety Data Sheet for Rubinate TDI 80/20.

STORAGE AND HANDLING PRECAUTIONS

The reaction of isocyanates with water leads to the formation of insoluble ureas and carbon dioxide gas which can result in pressure buildup inside closed containers. Therefore, extreme care must be taken to assure containers used for **Rubinate TDI 80/20** remain dry.

Freshly manufactured **Rubinate TDI 80/20** is a water white to pale yellow liquid. Sedimentation is usually due to contamination from atmospheric moisture or crystallization. Reaction from atmospheric moisture can be prevented by storing **Rubinate TDI 80/20** in carefully sealed containers, under a dry nitrogen or dry air atmosphere. During handling, **Rubinate TDI 80/20** must also be protected from atmospheric moisture and water ingress, and containers must be carefully resealed after each sampling.

Rubinate TDI 80/20 bulk shipments are made in temperature controlled road tankers at a temperature of 70-100°F (21-38°C) and should be stored within this temperature range under a dry nitrogen or dry air (−40°F, −40°C dew point) blanket. Crystallization of the 2,4-isomer of TDI 80/20 begins to occur below a material temperature of 60°F (15°C).

Should crystallization or freezing occur in storage, the material should be heated and maintained at 75-95°F (24-35°C) for enough time to ensure that all crystals have melted. After melting is complete, the material should be agitated or circulated.

Rubinate TDI 80/20 is also available in 55 gallon drums. If drums have been exposed to temperatures below 60°F (15°C) for more than a few hours, the material may crystallize. Crystallized material may be melted out as above.

Storage of drums for more than two weeks should be within a temperature range of 70°F to 100°F (21-38°C).

Rubinate TDI 80/20 which is stored at too high a temperature for an extended period of time may develop a color.

A small amount of finely divided insoluble solid in the liquid product does not usually cause difficulties in handling or product performance. However, if necessary, the liquid product may be filtered through a suitable in-line filter. It is suggested that the filter vessel be of stainless steel with a suitable polypropylene filter bag. The lines should be heated and blown clear with nitrogen after use.

After use, drums should be decontaminated according to the procedure outlined in the Advisory Bulletin "Safety, Storage and Handling Procedures for **Rubinate TDI 80/20** Toluene Diisocyanate" and should not be used for any other purpose.

For general information on bulk storage and handling, refer to the Advisory Bulletin "Safety, Storage and Handling Procedures for Rubinate TDI 80/20 Toluene Diisocyanate" and the Material Safety Data Sheets for Rubinate TDI 80/20.

ICI Polyurethanes Group

For information on Rubinate® Products contact:
Chemicals Division
Mantua Grove Road
West Deptford, NJ 08066
(609) 423-8300
(800) 257-5547

Formulated Products Division
6555 Fifteen Mile Road
Sterling Heights, MI 48077
(313) 826-7660
(800) 553-8624

12/88/2M

Polyurethanes

MATERIAL SAFETY DATA SHEET

ICI POLYURETHANES GROUP • Mantua Grove Road • W. Deptford, NJ 08066 • (609) 423-8300

800-424-9300 (24 hours) for Spills, Leaks, Fire & Exposure (CHEMTREC)
800-327-8633 (24 hours) Medical Emergencies or Inquiries
800-257-5547 (daytime) Safety, Health, and Environmental Technical Assistance

SECTION 1 NAME AND HAZARD SUMMARY

Material name:
RUBINATE® TDI

Hazard summary (as defined by OSHA Hazard Comm. Std., 29 CFR 1910.1200):
Physical hazards: Unstable.
Health hazards: Corrosive (eye), irritant (skin, respiratory passages, skin sensitizer), inhalation (TLV), harmful pulmonary (lung) sensitizer. Based on TDI – harmful (respiratory sensitizer, lung injury).

Read the entire MSDS for a more thorough evaluation of the hazards.

SECTION 2 INGREDIENTS

	%	TLV (ACGIH)
Toluene diisocyanate, 2,4-isomer (CAS 584-84-9)	80	0.005 ppm
Toluene diisocyanate, 2,6-isomer (CAS 91-08-7)	20	Not listed

Ingredients not precisely identified are proprietary or nonhazardous. Values are not product specifications.

SECTION 3 PHYSICAL DATA

Appearance and odor: Clear, colorless liquid with sharp odor
Boiling point: 484°F, 251.1°C
Vapor pressure (mm Hg at 20°C): 0.02
Vapor density (air = 1): 6.0
Solubility in water: Reacts
pH: No data
Specific gravity: 1.22
% Volatile by volume: No data

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

Flash point: 270°F, 132°C (OC)
Autoignition temperature: No data
Flammable limits (STP): 0.9-9.5%

SECTION 4 FIRE AND EXPLOSION HAZARD DATA (continued)

Extinguishing media:
Dry chemical, foam, carbon dioxide, halogenated agents. If water is used, use very large quantities. The reaction between water and hot isocyanate may be vigorous.

Special fire fighting protective equipment:
Self-contained breathing apparatus with full facepiece and protective clothing.

Unusual fire and explosion hazards:
Water contamination will produce carbon dioxide. Do not reseal contaminated containers as pressure buildup may rupture them.

SECTION 5 REACTIVITY DATA

Stability:
Stable under normal conditions.

Incompatibility:
This product will react with any materials containing active hydrogens, such as water, alcohol, ammonia, amines, alkalies and acids. The reaction with water is very slow under 50°C, but is accelerated at a higher temperatures and in the presence of alkalies, tertiary amines, and metal compounds. Some reactions can be violent.

Hazardous decomposition products:
Combustion products: Carbon dioxide, carbon monoxide, nitrogen oxides, ammonia. Trace amounts of hydrogen cyanide.

Hazardous polymerization:
May occur. High temperatures in the presence of alkalies, tertiary amines, and metal compounds will accelerate polymerization. Possible evolution of carbon dioxide gas may rupture closed containers.

SECTION 6 HEALTH HAZARD ASSESSMENT

General:
The health hazard assessment is based on an evaluation of the chemical composition together with information from a search of the scientific literature and other commercial sources.

Ingestion:
The acute oral LD_{50} in rat is reported to be 5,800 mg/kg. Relative to other materials, this material is classified as "practically nontoxic" by ingestion. In humans, irritation or chemical burns of the mouth, pharynx, esophagus and stomach can develop following ingestion. Injury may be severe and cause death.

Eye contact:
This material is reported to induce chemical burns in rabbit eye studies; a similar degree of eye injury may develop after contact with human eyes.

Skin contact:
This material is reported to be severely irritating in rabbit dermal irritation studies and will probably irritate human skin. Skin sensitization and irritation may develop after repeated and/or prolonged contact with human skin.

SECTION 6 HEALTH HAZARD ASSESSMENT (continued)

Skin absorption:

The acute dermal LD_{50} in rabbit is reported to be above 16 g/kg. Systematically toxic concentrations of this product will probably not be absorbed through human skin.

Inhalation:

Vapors and aerosols can irritate eyes, nose and respiratory passages. TDI vapors are easily generated and are lethal to rats via inhalation at concentrations below 10 ppm. A no effect level for rats of about 0.1 ppm was determined from a subacute study. This and other data indicate the vapors and aerosols of TDI are highly toxic relative to the vapors of other compounds. Vapors and aerosols of TDI strongly irritate the upper and lower respiratory tract. Human experience indicates that TDI will induce an asthma-like respiratory sensitization in some individuals. If applications which involve spraying (e.g., aerosols and mists) or if elevated temperatures are used, even higher vapor concentrations may result and introduce a greater degree of risk of inhalation injury. Rat and mouse toxicity and carcinogenicity studies were conducted with two years of inhalation exposure to vapors of TDI at concentrations of 0.05 and 0.15 ppm. No indication of carcinogenic effect was observed. However, mice exposed to 0.15 ppm for two years showed reduced weight gain and signs of irritation in the upper and lower respiratory tract. No other effect of toxicological significance was observed.

Other effects of overexposure:

There are two studies which allege that workers exposed to TDI at or near the current TLV have experienced impaired ventilatory capacities. These findings have not been independently substantiated. The National Toxicology Program (NTP) 4th Annual Report on Carcinogens (1985) lists TDI as a substance that may reasonably be anticipated to be a carcinogen based on a NTP Technical Report. In the cited study, laboratory animals gavaged TDI in corn oil developed cancer. In our view, the inhalation study is of more potential biological relevance to man.

First aid procedures:

Skin: Wash material off of the skin with plenty of soap and water. If redness, itching, or a burning sensation develops, get medical attention. Wash contaminated clothing and decontaminate footwear before reuse.

Eyes: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Have eyes examined and treated by medical personnel.

Ingestion: Do not induce vomiting. Give 1 or 2 glasses of water to drink and refer person to medical personnel. (Never give anything by mouth to an unconscious person.)

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is labored, give oxygen. Consult medical personnel.

Note to physician: Probable mucosal damage may contraindicate the use of gastric lavage following ingestion.

SECTION 7 SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Wear skin, eye, and respiratory protection during cleanup. Soak up material with an absorbent and shovel into waste container. Cover container, but do not seal, and remove it from the work area. Prepare a decontamination solution of 0.2-5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material safety data sheets. All operations should be performed by trained personnel familiar with the hazards of the chemicals used. Treat the spill area with the decontamination solution, using about 10 parts of the solution for each part of the spill, and allow it to react for at least 10 minutes. Carbon dioxide will be evolved, leaving insoluble polyureas. For major spills, call CHEMTREC (Chemical Transportation Emergency Center) at 800-424-9300.

SECTION 7 SPILL OR LEAK PROCEDURES (continued)

Disposal method:

Slowly stir the isocyanate waste into the decontamination solution described above using 10 parts of the solution for each part of isocyanate. Let stand for 48 hours, allowing the evolved carbon dioxide to vent away. Neutralize the waste. Neither the solid nor the liquid portion is a hazardous waste under RCRA, 40 CFR 261.

Container disposal:

Drums must be decontaminated in properly ventilated areas by personnel protected from the inhalation of isocyanate vapors. Spray or pour 5-15 liters of decontaminating solution into the drum, making sure the walls are well rinsed. Leave the drum soaking unsealed for 48 hours. Pour out the decontaminating solution and triple rinse the empty container. Puncture or otherwise destroy the rinsed container before disposal.

SECTION 8 SPECIAL PROTECTION INFORMATION

TLV® or suggested control value:

The ACGIH TLV and OSHA PEL for TDI is 0.005 ppm 8-hour TWA, 0.02 ppm ceiling. NIOSH recommends 0.005 ppm TWA and 0.02 ppm STEL.

Ventilation:

If needed, use local exhaust ventilation to keep airborne concentrations below the TLV. Follow guidelines in the ACGIH publication "Industrial Ventilation". Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination.

Respiratory protection:

Because of the low vapor pressure, ventilation is usually sufficient to keep vapors below the TLV at room temperatures. Exceptions are when the material is sprayed or heated. If airborne concentrations exceed or are expected to exceed the TLV, use MSHA/NIOSH approved positive pressure supplied air respirator with a full facepiece or an air supplied hood. For emergencies, use a positive pressure self-contained breathing apparatus. Air purifying (cartridge type) respirators are not approved for protection against isocyanates.

Protective clothing:

Gloves determined to be impervious under the conditions of use. Depending on conditions of use, additional protection may be required such as apron, arm covers, or full body suit. Wash contaminated clothing before rewearing. The literature indicates that clothing constructed of butyl rubber, Viton, Silver Shield, Saranex coated Tyvek, as well as some nitrile rubber and polyvinyl alcohol (PVA) coated garments have excellent resistance to permeation by TDI. Clothing constructed of Teflon, as well as some garments constructed of nitrile rubber, natural rubber and PVA exhibited limited resistance to permeation by TDI. Some clothing constructed of natural rubber or polyethylene exhibited little resistance to permeation by TDI. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.

Eye protection:

Chemical tight goggles and full faceshield.

Other protective equipment:

Eyewash station and safety shower in work area.

SECTION 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS

Special precautions or other comments:

Prevent skin and eye contact. Observe TLV limitations. Avoid breathing vapors or aerosols. Workers should shower and change to fresh clothing after each shift. A sensitized individual should not be exposed to the product which caused the sensitization. Store in tightly sealed containers to protect from atmospheric moisture. Store in a cool area. Individuals with existing respiratory disease such as chronic bronchitis, emphysema or asthma should not be exposed to isocyanates. These individuals should be identified through baseline and annual evaluation and removed from further exposure. Medical examination should include medical history, vital capacity, and forced expiratory volume at one second.

SECTION 10 REGULATORY INFORMATION

TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710:

All ingredients are on the TSCA Section 8(b) Inventory.

CERCLA and SARA Regulations (40 CFR 355, 370, and 372):

Section 313 Supplier Notification. This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: 100% TDI (CAS 584-84-9 and 91-08-7).

State Regulations:

California Proposition 65: No warnings are necessary.

The information herein is given in good faith but no warranty, expressed or implied, is made.

The ICI Polyurethanes Group is a business unit of ICI Americas Inc.

Polyurethanes

Rubinate® TDI 80/20

Safety, Storage and Handling Procedures for Rubinate TDI 80/20 Toluene Diisocyanate

RB-14 rev

SAFETY PRECAUTIONS

All isocyanates are potentially hazardous materials (as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200) and require extreme care in handling. It is essential that all persons involved with the handling of these products be familiar with the proper safety and handling procedures.

Rubinate TDI 80/20 (toluene diisocyanate) is a liquid at ambient temperature. At these temperatures, Rubinate TDI has a relatively high vapor pressure and a vapor hazard exists. In the absence of adequate ventilation, it is likely to exceed recommended control limits.

The current OSHA Permissible Exposure Limit (PEL) for toluene-2,4-diisocyanate (TDI) is 0.02 ppm as a ceiling value (not to be exceeded at any time). The ACGIH Threshold Limit Value (TLV) for TDI is 0.005 ppm 8 hour TWA and 0.02 ppm Short Term Exposure Limit (STEL), NIOSH recommends a 0.005 ppm 8 hour TWA and a 10 minute 0.02 ppm ceiling limit. Personnel who may be exposed to isocyanate vapors above the TLV must wear an air-fed hood or approved respirator to avoid overexposure. Repeated inhalation of the vapor at low levels above the TLV could cause serious respiratory problems.

Rubinate TDI is a reactive chemical and great care must be taken when handling it to prevent ingestion or contact with the skin or eyes. The use of goggles or face shield, PVC or rubber gloves and apron will reduce chances of injury from contact with the product.

If splashes accidentally reach the eyes, immediately flush the eyes with plenty of water for at least 15 minutes and call a physician. Wash any material from the skin with soap and plenty of water. Immediately remove any contaminated clothing or shoes. If redness, itching or a burning sensation develops after exposure, or following repeated or prolonged skin contact, seek medical attention. Wash clothing and decontaminate shoes before reuse. If ingestion occurs, do not induce vomiting. Administer large amounts of milk or water and contact a physician. If irritation or respiratory problems develop after inhalation of TDI, get to fresh air and seek medical attention. TDI may induce acute irritant reactions or hypersensitivity reactions such as asthma-like respiration responses, in exposed persons. These reactions may be delayed for up to several hours after exposure. Persons previously sensitized to TDI should be removed from all exposure.

See the Material Safety Data Sheet for Rubinate TDI 80/20 for additional details.

IN CASE OF SPILLS

In case of spills, be sure that area is well ventilated. If necessary, evacuate spill area to prevent inhalation of vapor from the spill. Skin, eye and respiratory protection must be worn during spill cleanup. Dike spill and soak up chemical with a commercial absorbent or sand and shovel into waste container. loosely cover container and remove it from the work area. Soak contents of waste container with an aqueous decontamination solution of 3-8% ammonia and 0.2-0.5% detergent for 48 hours. Dispose of treated waste in accordance with waste disposal regulations.

Empty containers should not be disposed of until all hazardous residue has been removed. Remove container from work area, preferably outdoors, or in a well-ventilated area. Fill container with decontamination solution and allow to stand for 48 hours. Do not seal or otherwise close bungs in container. After draining the container, puncture or crush it and dispose of it in accordance with waste disposal regulations.

FIRE HAZARD

Most isocyanates have a high flash point and are not normally considered as flammable. However, they may burn if heated sufficiently.

Any isocyanate involved in a fire will evolve toxic fumes in high concentrations. Full emergency equipment should be worn by all personnel dealing with such incidents; the use of self-contained breathing apparatus is essential. Drums of isocya-

nate involved in a fire should be sprayed with water to minimize risk of rupture.

After the fire has been extinguished, the area should not be considered safe until a thorough inspection for residual isocyanate has been carried out by properly protected personnel. Any suspect residues should be rendered harmless with liquid decontaminant.

Suitable extinguishing agents include:
Dry chemical powder.
Carbon dioxide
Water*
Foam

*If water is used, it should be in a very large quantity. Care must be taken as the reaction between water and hot isocyanate may be vigorous.

STORAGE PRECAUTIONS

Moisture, either as a vapor or liquid, is the most probable cause of isocyanate contamination. Rubinate® TDI 80/20 reacts readily with water, producing solid deposits and evolution of carbon dioxide gas. Storage under a slight positive pressure (a few inches water gauge) of dry nitrogen (−40°F, −40°C dew point) is essential to prevent ingress of moisture. Care should be taken, however, in using any pressure above 20 psig., as increasing solubility of the gas in the isocyanate may adversely affect further processing steps or products. Carbon dioxide should not be used for this purpose at any pressure because of its solubility in isocyanates. Pay particular attention to maintaining a dry atmosphere in vessels from which the isocyanate is being pumped or those being cooled. The recommended storage temperature for Rubinate TDI 80/20 is between 70-100°F (21-38°C).

RECOMMENDED EQUIPMENT

Storage Tanks

Rubinate TDI 80/20 can be stored in a stainless steel, carbon steel, or a suitable resin-lined vessel. Use of copper-bearing steel tanks is not recommended. The size of the storage vessel will depend primarily on the scale of production. It is recommended for minimum requirements that two vessels be installed, each having a capacity approximately 20% greater than that of the usual transport container. With this arrangement, successive deliveries can be discharged to the vessels alternately. If only one bulk storage vessel is installed, it is advisable that the nominal capacity be approximately 50% greater than that of the transport container.

For best flow and storage stability, maintain at recommended temperatures. The vessels should be insulated and provided with a heating system. Heat tanks by carefully designed electrical tracing. Internal coils are not advised because of the chance of leakages causing contamination of the product.

The outlet nozzle from the tank should be raised 3" to 6" from the floor of the tank to prevent transfer of any solids or foreign matter to further processing stages. A drain valve should be located at the bottom of the tank.

Fit vessels with temperature and level indicators. Pressure and vacuum relief devices are advisable to protect the tank in case of blockages in the vent line.

Vessels should be designed to API Standards, with due allowance made for the specific gravity of the material. Under normal conditions, no internal corrosion allowance is necessary.

Pumps

Pumps can be stainless steel, ductile iron, or carbon steel. Stainless steel, Type 316, is preferred.

Exact details of pump sizing will vary with the layout of storage tanks, unloading facilities and scope of facility.

Pumps may be either centrifugal or rotary type. Positive displacement rotary pumps are preferred, due to the lower operating speeds. Such pumps must be equipped with relief valve bypass returning to the tank. Glandless pumps (such as Chempump or Kontro, etc.) give no leakage but are more expensive.

Pump seals are critical to prevent moisture contamination. A single outside mechanical seal will work satisfactorily if kept warm and dry. Double mechanical static seals are preferred.

Piping

Pipe and fittings conveying isocyanates can be made from any of the materials indicated for pumps or containers. Stainless steel is preferred. Care must be taken in sizing pressure loss valves to ensure that pump capacity, suction and discharge are not reduced. Clean carbon steel pipe, Schedule 40, with 150# fittings may be used if the cost of stainless steel proves to be prohibitive.

Flexible pipe may be double braid reinforced stainless steel hose. For smooth flow and for increased protection, PTFE or butyl rubber lined hose is preferred. Pressure or vacuum rating of hose should be compatible with pump characteristics.

Joints in stainless steel pipe should be made with stainless steel stub ends and carbon steel flanges, 150# rating. Carbon steel pipe joints may be made with 150# weld neck or slip-on flanges. Screwed joints can be used if installed with care and tape thread sealant is used.

Piping located outdoors, and where the isocyanate is likely to be trapped, should be hot-water traced or wrapped with electric heating tape and insulated. Do not heat sections of pipe between closed valves which are completely filled with material, as thermal expansions of the material could lead to failure of the joints.

Clean all new piping with solvent to remove oil and then dry before assembly.

The entire piping system should be designed to ensure proper drainage and should be specified as "silicone free."

Filter

A suitably heated filter is desirable between the off-loading pump and the machine tank or reactor.

Valves

Satisfactory results can be obtained with PTFE-lined plug, diaphragm or ball valves. The valves should have PTFE self-lubricating seals.

Valves should be flanged to 150# standard.

Venting

The bulk storage tank and the tank in which TDI is received should be vented in a manner similar to shown on the diagrammatic flow plan. Dry nitrogen should be used (dew point −40°F, −40°C).

Venting through an activated carbon vent scrubber may be required in those locations prohibiting TDI emissions. The efficiency of such a scrubber should be monitored to ensure its proper operation.

For more detailed information or assistance in the Safety, Storage and Handling of Rubinate® TDI 80/20, contact your ICI Polyurethanes Group representative.

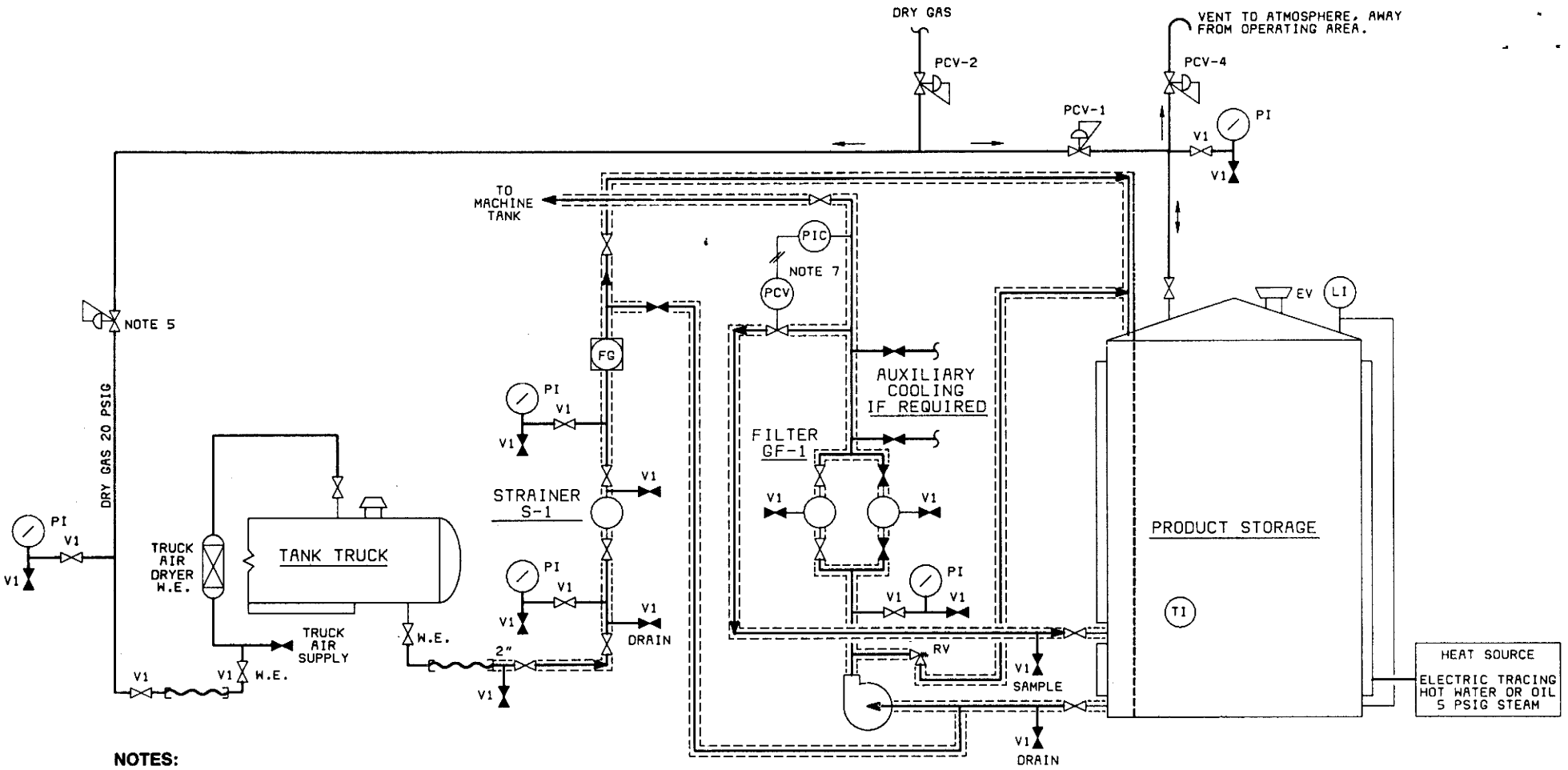
ICI Polyurethanes Group

For information on Rubinate® Products contact:
Chemicals Division
Mantua Grove Road
West Deptford, NJ 08066
(609) 423-8300
(800) 257-5547

Formulated Products Division
6555 Fifteen Mile Road
Sterling Heights, MI 48077
(313) 826-7660
(800) 553-8624

7/88/2M

BULK STORAGE FACILITIES
RUBINATE® TDI 80/20 ISOCYANATE



NOTES:

1. PRODUCT TEMPERATURE CONTROL IS IMPORTANT TO MAINTAIN QUALITY. CONSULT ICI SALESMAN FOR SPECIFIC TEMPERATURE RANGES.
2. DO NOT ALLOW STAGNANT PRODUCT IN LINES FOR LONG PERIODS.
3. TEMPERATURE MAINTENANCE IS REQUIRED.
4. STORAGE TANK IS RECOMMENDED TO BE STAINLESS STEEL.
5. ADEQUATE PROVISIONS MUST BE MADE TO PROTECT TANK TRUCK OR RAIL CAR FROM EXCESSIVE PLANT LINE PRESSURE.
6. EMERGENCY VENT SHOULD BE SIZED TO HANDLE REACTION PRODUCTS (i.e. GAS AND FOAM) FROM FOAM-PRODUCING REACTIONS.
7. PCV SHOULD BE LOCATED IDEALLY AT MACHINE TANK TO PREVENT STAGNATION OF PRODUCT IN LINE.

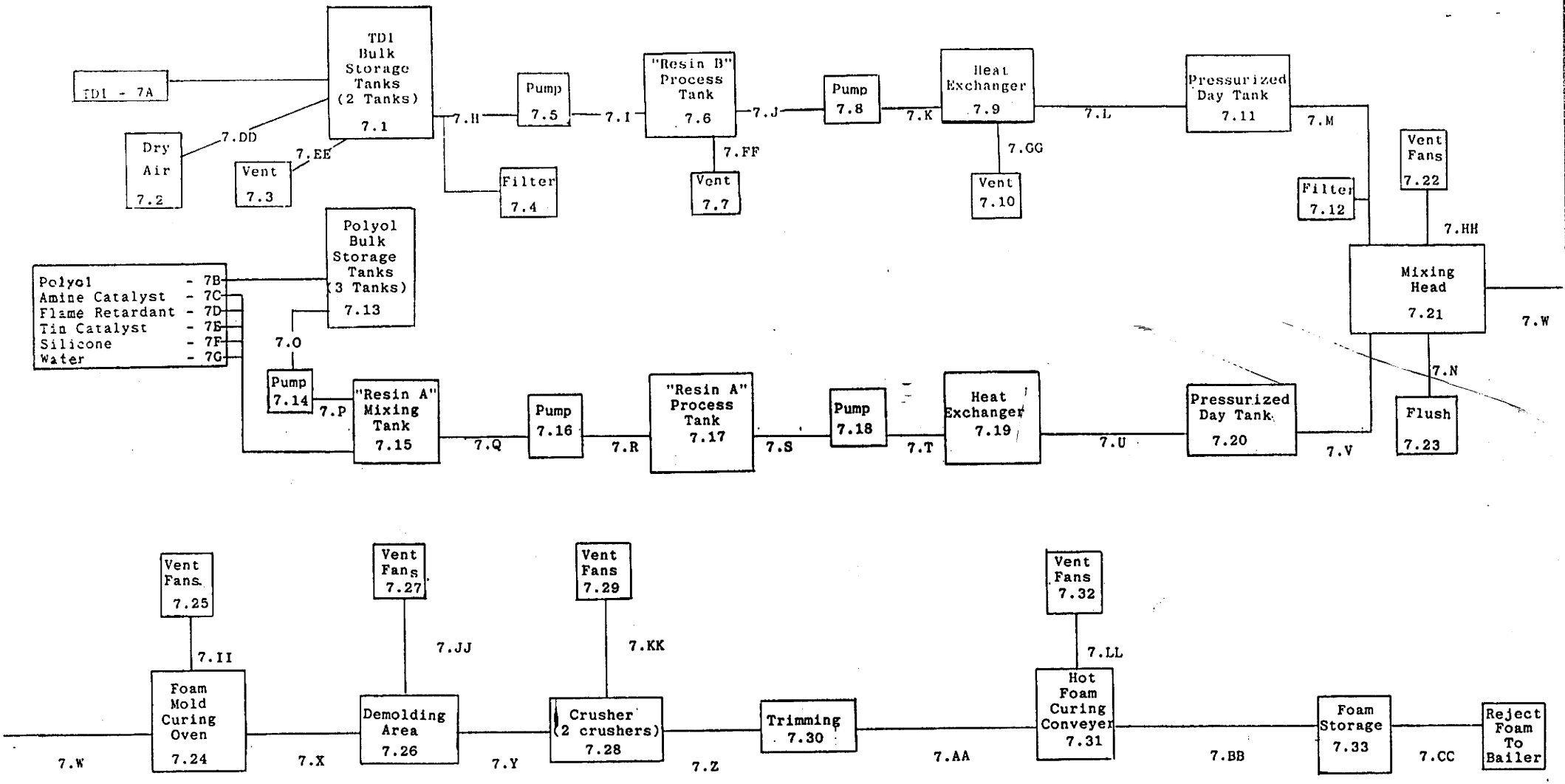
BLUE DENOTES AIR AND GAS LINES.
BLACK DENOTES PRODUCT.

EQUIPMENT CODE

S-1	STRAINER (1/4" MESH)	PCV-1	PRESSURE CONTROL VALVES SET FOR EQUIPMENT SPECIFICATION
PI	PRESSURE INDICATOR	PCV-2	
GF-1	FILTER (50 MICRON)	PCV-3	
FG	SIGHT FLOW INDICATOR	PCV-4	
PIC	PRESSURE INDICATOR CONTROLLER	LI	LEVEL INDICATOR
EV	EMERGENCY VENT / VACUUM BREAKER	V1	3/4" PLUG VALVE
TI	TEMPERATURE INDICATOR		
RV	RELIEF VALVE (SEPARATE FROM PUMP) (ONLY NECESSARY FOR POSITIVE DISPLACEMENT PUMPS)		
W.E.	WITH EQUIPMENT (TRUCK OR RAIL CAR)		

FC068G

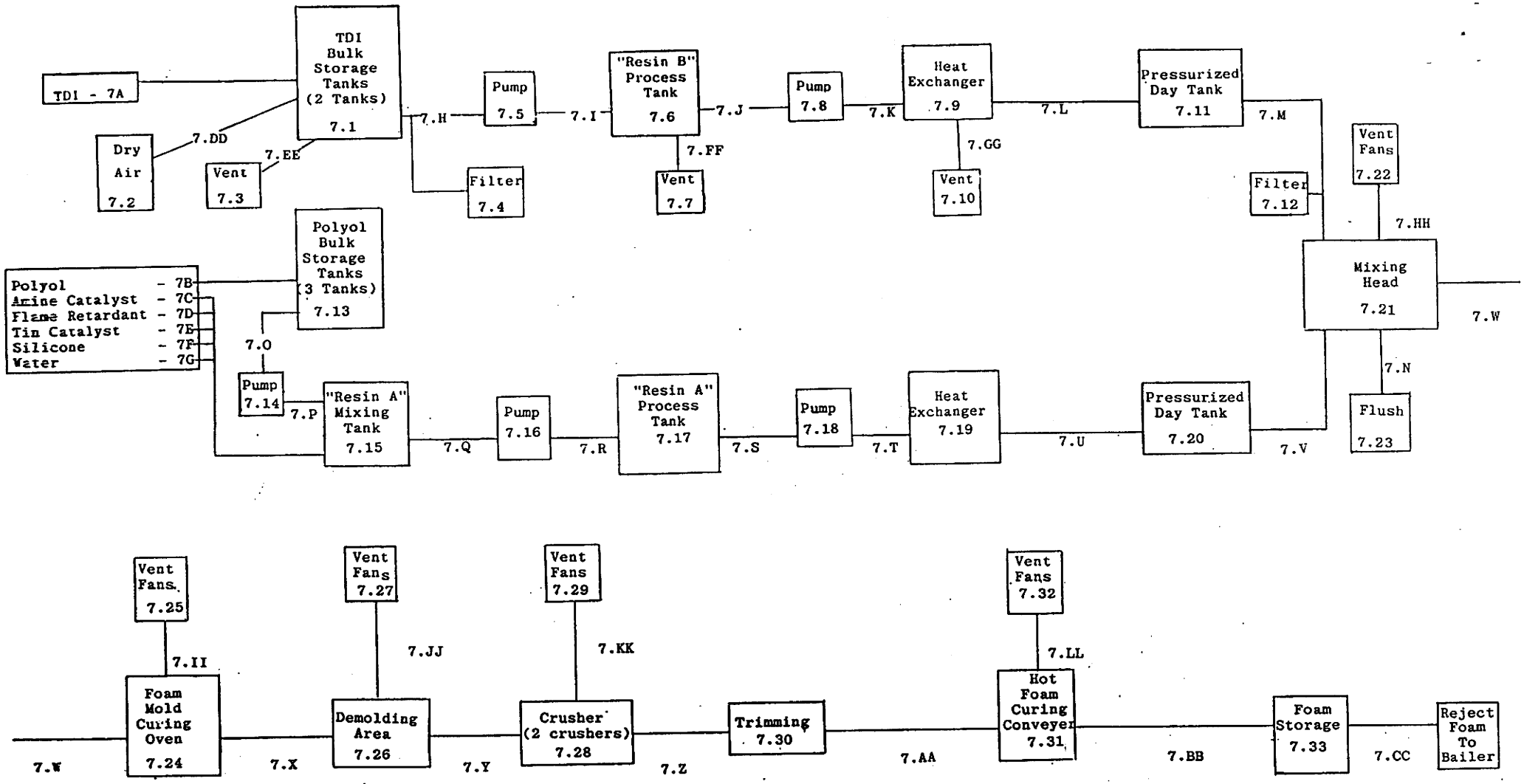
7.01 PROCESSOR
Process Type: Injection Molded Flexible Polyurethane Foam Manufacturing Process
Intermediates: None



7.03 EMISSIONS

Process Type: Injection Molded Flexible Polyurethane Foam Manufacturing Process

Intermediates: None



TDI Emissions

7.29 Crusher Vent Fans
7.32 Curing Area Vent Fans
7.5, 7.8 TDI Pump Seals
7.4, 7.12 TDI Filters

7.3 TDI Bulk Storage Vents
7.7 "Resin B" Tank Vent
7.10 Heat Exchanger Vent Fans
7.22,7.25 Reaction Zone Vent Fans
7.27 Demolding Area Vent Fans

7.04 Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Unit Operation ID Number	Typical Equipment Type	Operating Temperature Range (°C)	Operating Pressure Range (mm Hg)	Vessel Composition
7.11	Day Tank	10°	1 8 1 2	Steel
7.12	T D I Filter	10°	1 8 1 2	Steel
7.13	Storage Tank	Ambient	Atmospheric	Steel
7.14	Pump	Ambient	1 8 1 2	Cast Iron
7.15	Mixing Tank	Ambient	Atmospheric	Steel
7.16	Pump	Ambient	1 8 1 2	Cast Iron
7.17	Process Tank	Ambient	5 1 8	Steel
7.18	Pump	Ambient	1 8 1 2	Cast Iron
7.19	Heat Exchanger	10°	1 8 1 2	Steel
7.20	Day Tank	10°	1 8 1 2	Steel

[XX] Mark (X) this box if you attach a continuation sheet.

7.04 **Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.**

CBI

[ ] **Process type .....** Foam Production

Unit Operation ID Number	Typical Equipment Type	Operating Temperature Range (°C)	Operating Pressure Range (mm Hg)	Vessel Composition
7.21	Mixing Head	10°	2070	Steel
7.22	Vent Fans	Ambient	Atmospheric	Steel
7.23	Mixing Head Flush	10°	2070	N/A
7.24	Mold Curing Oven	60°	Atmospheric	N/A
7.25	Vent Fans	Ambient	Atmospheric	Steel
7.26	Demolding Area	Ambient	Atmospheric	N/A
7.27	Vent Fans	Ambient	Atmospheric	Steel
7.28	Crushers	Ambient	Atmospheric	Steel
7.29	Vent Fans	Ambient	Atmospheric	Steel
7.30	Trimming Area	Ambient	Atmospheric	N/A

[XX] **Mark (X) this box if you attach a continuation sheet.**

7.04 Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] **Process type** ..... Foam Production

Unit Operation ID Number	Typical Equipment Type	Operating Temperature Range (°C)	Operating Pressure Range (mm Hg)	Vessel Composition
7.31	Curing Conveyer	Ambient	Atmospheric	Steel
7.32	Vent Fans	Ambient	Atmospheric	Steel
7.33	Foam Storage	Ambient	Atmospheric	N / A

[ ] Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
7I	T D I	OL	92,848
7J	T D I	OL	92,848
7K	T D I	OL	92,848
7L	T D I	OL	92,848
7M	T D I	OL	92,848
7N	Partially Reacted Foam	OL	240,098
7O	Polyol	OL	137,779
7P	Polyol	OL	137,779

[1]Use the following codes to designate the physical state for each process stream:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[XX] Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
7Q	Polyol/Catalyst Blend	OL	147,250
7R	Polyol/Catalyst Blend	OL	147,250
7S	Polyol/Catalyst Blend	OL	147,250
7T	Polyol/Catalyst Blend	OL	147,250
7U	Polyol/Catalyst Blend	OL	147,250
7V	Polyol Catalyst Blend	OL	147,250
7W	Partially Reacted Foam	OL	240,098
7X	Polyurethane Foam	SO	240,098

[1]Use the following codes to designate the physical state for each process stream:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
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[XX] Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
7Y	Polyurethane Foam	SO	240,098
7Z	Polyurethane Foam	SO	240,098
7AA	Polyurethane Foam	SO	240,098
7BB	Polyurethane Foam	SO	240,098
7CC	Polyurethane Foam	SO	240,098
7DD	Dry Air	GU	UK
7EE	T D I Vent	GU	UK
7FF	T D I Vent	GU	UK

[1]Use the following codes to designate the physical state for each process stream:

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7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... Foam Production

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
7GG	T D I Vent	GU	U K
7HH	Reaction Zone Vent	GC	U K
7II	Curing Area Vent	GC	U K
7JJ	Curing Area Vent	GC	U K
7KK	Crusher Vents	GC	U K
7LL	Curing Area Vents	GC	U K

[1]Use the following codes to designate the physical state for each process stream:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[ ] Mark (X) this box if you attach a continuation sheet.

7.06 Characterize each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the CBI instructions for further explanation and an example.)

[ ] Process type ..... Foam Production

a. Process Stream ID Code	b. Known Compounds[1]	c. Concentrations[2,3] (% or ppm)	d. Other Expected Compounds	e. Estimated Concentrations (% or ppm)
7G	Water	100%(E)(W)	N / A	N / A
7H-7M	T D I	99.9%(E)(W)	U K	U K
7N	Polyol	57.4%(E)(W)	N / A	N / A
	Additive Package 1	2.2%(E)(W)	N / A	N / A
	Water	1.7%(E)(W)	N / A	N / A
	T D I	38.7%(E)(W)	N / A	N / A

7.06 continued below

[XX] Mark (X) this box if you attach a continuation sheet.

7.06 **Characterize each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the instructions for further explanation and an example.)**

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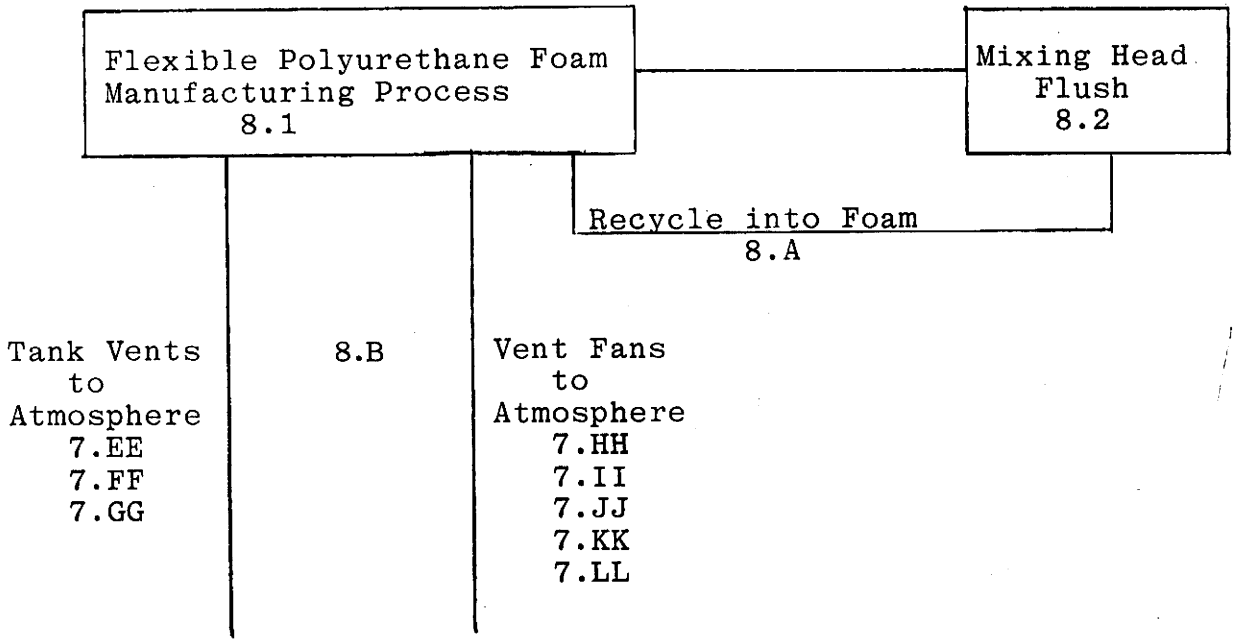
[ ] **Process type .....** Foam Production

a. Process Stream ID Code	b. Known Compounds[1]	c. Concentrations[2,3] (% or ppm)	d. Other Expected Compounds	e. Estimated Concentrations (% or ppm)
7O-7P	Polyol	100%(E)(W)	N / A	N / A
7Q-7V	Polyol	93.6%(E)(W)	N / A	N / A
	Additive Package 1	3.6%(E)(W)	N / A	N / A
	Water	2.8%(E)(W)	N / A	N / A
7W-	Polyurethane Foam	100%(E)(W)	N / A	N / A

7.06 **continued below**

[ ] **Mark (X) this box if you attach a continuation sheet.**

8.01
Process Type: Injection Molded Flexible Polyurethane Foam Manufacturing Process
Intermediates: None



9.03 Provide a descriptive job title for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance.

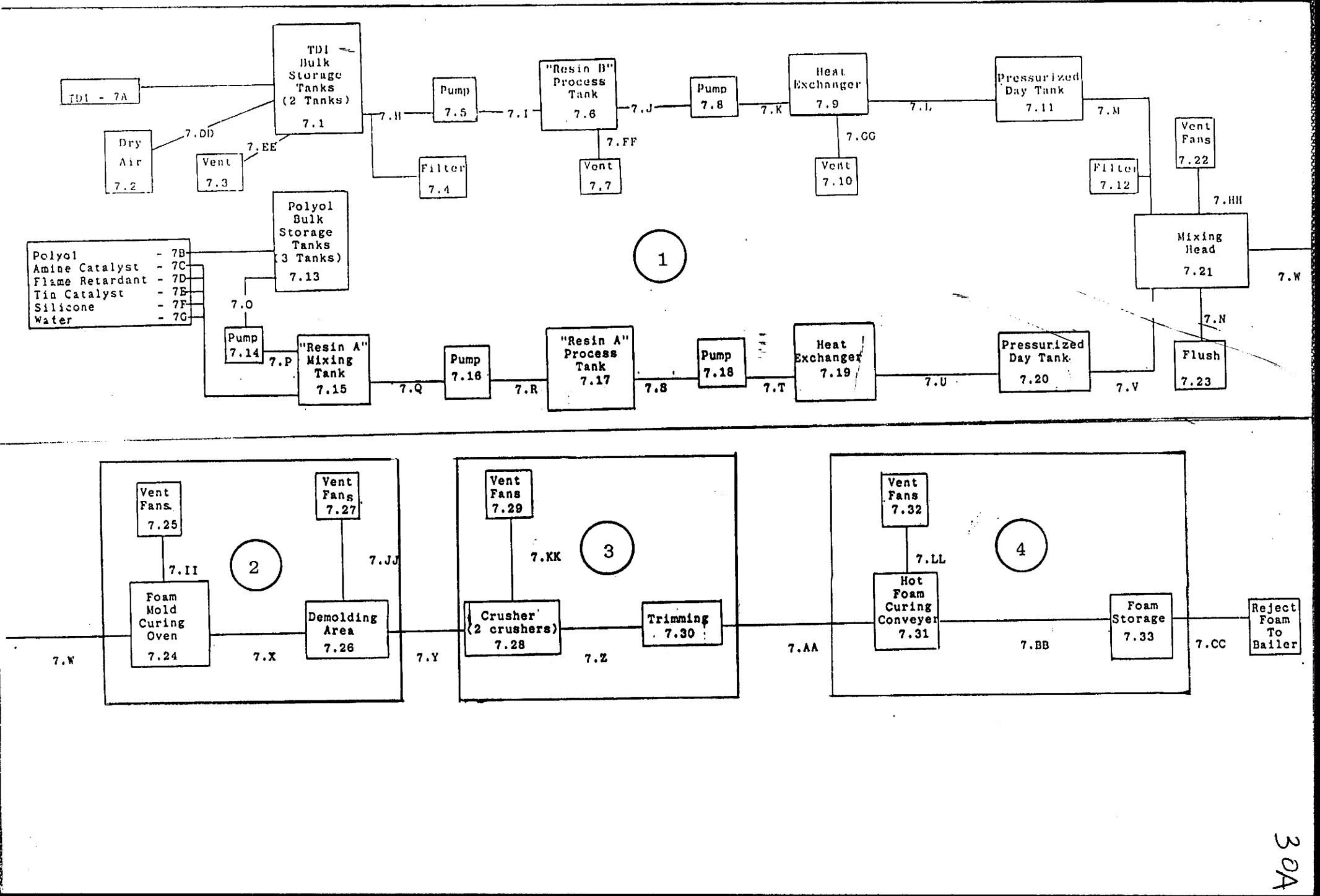
CBI

[ ]

Labor Category		Descriptive Job Title
XXXX	K	Packer
B		
C		
D		
E		
F		
G		
H		
I		
J		

[ ] Mark (X) this box if you attach a continuation sheet.

9.04
ProcessType: Injection Molded Flexible
Polyurethane Foam Manufacturing
Intermediates: None



9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question
CBI and complete it separately for each process type and work area.

[ ] Process type ..... Foam Production

Work area 2

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance[1]	Average Length of Exposure Per Day[2]	Number of Days per Year Exposed
E,F	4	Inhalation	GU	E	243

[1]Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure; includes fumes, vapors, etc.)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[2]Use the following codes to designate average length of exposure per day:

A = 15 minutes or less
B = Greater than 15 minutes, but not exceeding 1 hour
C = Greater than one hour, but not exceeding 2 hours
D = Greater than 2 hours, but not exceeding 4 hours
E = Greater than 4 hours, but not exceeding 8 hours
F = Greater than 8 hours

[XX] Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 3

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance[1]	Average Length of Exposure Per Day[2]	Number of Days per Year Exposed
G, H	3	Inhalation	GU	E	243

[1]Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure; includes fumes, vapors, etc.)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[2]Use the following codes to designate average length of exposure per day:

A = 15 minutes or less
B = Greater than 15 minutes, but not exceeding 1 hour
C = Greater than one hour, but not exceeding 2 hours
D = Greater than 2 hours, but not exceeding 4 hours
E = Greater than 4 hours, but not exceeding 8 hours
F = Greater than 8 hours

[XX] Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question
CBI and complete it separately for each process type and work area.

[ ] Process type ..... Foam Production

Work area 4

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance[1]	Average Length of Exposure Per Day[2]	Number of Days per Year Exposed
I,J,K	3	Inhalation	GU	E	243

[1]Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure; includes fumes, vapors, etc.)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[2]Use the following codes to designate average length of exposure per day:

A = 15 minutes or less
B = Greater than 15 minutes, but not exceeding 1 hour
C = Greater than one hour, but not exceeding 2 hours
D = Greater than 2 hours, but not exceeding 4 hours
E = Greater than 4 hours, but not exceeding 8 hours
F = Greater than 8 hours

[ ] Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 2

Labor Category	8-hour TWA Exposure Level (ppm, mg/m^3, other-specify)	15-Minute Peak Exposure Level (ppm, mg/m^3, other-specify)
E,F	<0.006 mg/m^3	U K

[XX] Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 3

Labor Category	8-hour TWA Exposure Level (ppm, mg/m^3, other-specify)	15-Minute Peak Exposure Level (ppm, mg/m^3, other-specify)
G,H	< 0.006 mg/m^3	U K

[XX] Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 4

Labor Category	8-hour TWA Exposure Level (ppm, mg/m^3, other-specify)	15-Minute Peak Exposure Level (ppm, mg/m^3, other-specify)
I,J,K	< 0.006 mg/m^3	U K

[ ] Mark (X) this box if you attach a continuation sheet.

PART C ENGINEERING CONTROLS

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 2

Engineering Controls	Used (Y/N)	Year Installed	Upgraded (Y/N)	Year Upgraded
Ventilation:				
Local exhaust	Y	1972	N	
General dilution	N			
Other (specify)				
	N			
Vessel emission controls	N			
Mechanical loading or packaging equipment	Y	1972	N	
Other (specify)				
	N			

[XX] Mark (X) this box if you attach a continuation sheet.

PART C ENGINEERING CONTROLS

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 3

Engineering Controls	Used (Y/N)	Year Installed	Upgraded (Y/N)	Year Upgraded
Ventilation:				
Local exhaust	Y	1972	N	
General dilution	N			
Other (specify)				
	N			
Vessel emission controls	N			
Mechanical loading or packaging equipment	Y	1972	N	
Other (specify)				
	N			

[XX] Mark (X) this box if you attach a continuation sheet.

PART C ENGINEERING CONTROLS

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 4

Engineering Controls	Used (Y/N)	Year Installed	Upgraded (Y/N)	Year Upgraded
Ventilation:				
Local exhaust	Y	1972	N	
General dilution	N			
Other (specify)				
	N			
Vessel emission controls	N			
Mechanical loading or packaging equipment	Y	1972	N	
Other (specify)				
	N			

[XX] Mark (X) this box if you attach a continuation sheet.

PART D PERSONAL PROTECTIVE AND SAFETY EQUIPMENT

9.14 Describe the personal protective and safety equipment that your workers wear or use in each work area in order to reduce or eliminate their exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... Foam Production

Work area 2,3,4

Equipment Types	Wear or Use (Y/N)
Respirators	N
Safety goggles/glasses	N
Face shields	N
Coveralls	N
Bib aprons	N
Chemical-resistant gloves	N
Other (specify)	
	N

[ ] Mark (X) this box if you attach a continuation sheet.

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